DOCUMENT RESUME

ED 343 785 SE 052 504

TITLE	Science Curriculum Guide. Kindergarten. Bulletin 1989, No. 70.
INSTITUTION	Alabama State Dept. of Education, Montgomery.
PUB DATE	89
NOTE	161p.; For related documents, see SE 052 503-509.
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052) -- Guides - Classroom Use - Instructional Materials (For Learner) (051)
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	Animals; Career Awareness; Chemistry; Earth Science; *Elementary School Science; *Experiential Learning; *Kindergarten; Light; Magnets; Physics; Plants (Botany); Primary Education; *Science Activities; Science Education; Solar Energy; State Curriculum Guides; Weather
IDENTIFIERS	*Alabama

ABSTRACT

The purpose of this curriculum guide is to help teachers implement the Alabama Course of Study: Science. The major emphasis of the guide is to provide student-oriented, hands-on activities that engage students in "sciencing" behaviors. This guide has two major components, the table of contents and the activities. The table of contents list by Roman numeral the units covered in kindergarten. Each unit is organized into topics that describe further the content of the grade level. The smallest organizers in the table of contents are the student outcomes that describe in detail what students are expected to learn about each topic. After each outcome, the reader is directed by page number to a classroom activity (or activities) that addresses the specific outcome. The second and largest component of the guide consists of classroom activities. Each activity begins with identifiers that summarize and introduce the activities. The identifiers are the Unit, Topic, and Outcome(s) addressed by the activity. Each activity contains a background section that provides teachers with information they may need to teach the activity effectively. Following the background, all materials needed for the activity are listed in a section entitled "Materials." Procedures for implementing the activity are outlined next. In some cases, extensions of an activity or source for an activity appear after the section on procedures. Units include the following: (1) "Animals"; (2) "Plants"; (3) "Air"; (4) "Solar Energy"; (5) "Weather and Seasonal Changes"; (6) "Matter"; (7) "Machines"; (8) "Magnets"; and (9) "Contributions and Careers in Science." (KR)

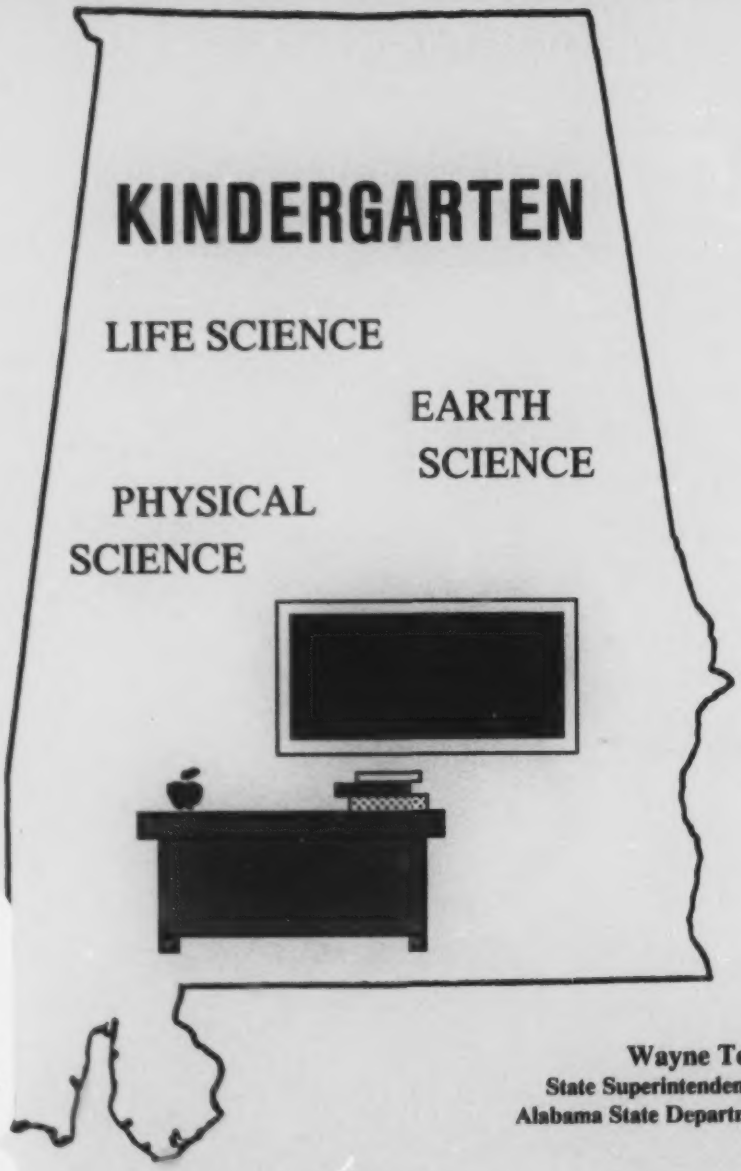
****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

SE

SCIENCE

CURRICULUM GUIDE

ED343785



"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
W. Teague
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

SE 052 504

Wayne Teague
State Superintendent of Education
Alabama State Department of Education

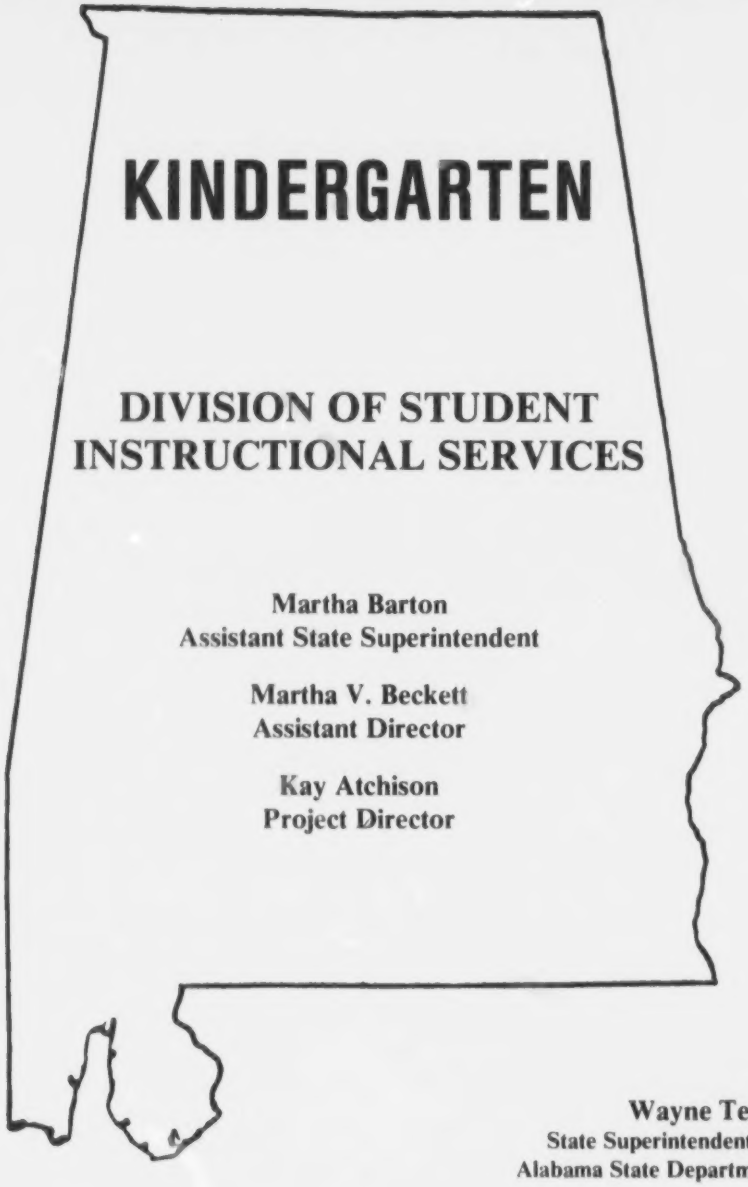
Bulletin 1989, No. 70

BEST COPY AVAILABLE

It is the official policy of the Alabama State Department of Education, including postsecondary institutions under the control of the State Board of Education, that no person in Alabama shall, on the grounds of race, color, handicap, sex, religion, national origin, or age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program, activity, or employment.

SCIENCE

CURRICULUM GUIDE



KINDERGARTEN

DIVISION OF STUDENT INSTRUCTIONAL SERVICES

Martha Barton
Assistant State Superintendent

Martha V. Beckett
Assistant Director

Kay Atchison
Project Director

Wayne Teague
State Superintendent of Education
Alabama State Department of Education

Bulletin 1989, No. 70

INTRODUCTION

The science curriculum guides consist of nine documents, one for each grade kindergarten through grade eight. The purpose of these curriculum guides is to help classroom teachers implement the Alabama Course of Study: Science (Bulletin 1988, No. 35). The major emphasis of each guide is to provide student-oriented, hands-on activities that engage students in "sciencing" behaviors.

The science curriculum guides have two major components, the Table of Contents and the activities. Each guide begins with the Table of Contents that lists by Roman numerals the units covered at a grade level. Each unit is organized into topics that describe further the content of the grade level. The smallest organizers in the Table of Contents are the student outcomes that describe in detail what students are expected to learn about each topic. After each outcome, a page number(s) directs the reader to a classroom activity (or activities) that addresses the specific outcome.

The second and largest component of the guide consists of classroom activities. Each activity begins with identifiers that summarize and introduce the activities. These identifiers are the Unit, Topic, and Outcome(s) addressed by the activity. Each activity contains a Background that provides teachers with information they may need to teach the activity effectively. Following the Background, all materials needed for the activity are listed in a section entitled Materials. Procedures for implementing the activity are outlined next. In some cases, extensions of an activity or sources for an activity appear after the Procedures.

The science curriculum guides are supplemental in nature. They were created to complement and enrich locally-developed science curriculum plans and to provide instructional resources for all topics named in the Alabama Course of Study: Science. Consequently, each activity in the curriculum guide stands alone and does not need to be taught in the order in which it appears in the document. It is expected that local education agencies will sequence the activities in this guide to correspond with the order in which topics are outlined in their locally-developed scope and sequence for science.

ACKNOWLEDGEMENTS

From its inception, the development of curriculum guides has been viewed as a cooperative effort between specialists in the Division of Student Instructional Services and selected teachers from public schools in Alabama. While the Curriculum Development Section, under the leadership of Katherine Mitchell, had the responsibility for coordinating the project, approximately 75 educators contributed directly to the science curriculum guides.

Work on the science curriculum guides started in the fall of 1988 when Kay Atchison was selected as Project Director for grades K-6 and Donna Bentley was named Project Director for grades 7 and 8. The second phase of the project involved the recruitment and training of approximately 35 classroom teachers and university instructors who wrote activities for the guides. For six months (December 1988 through May 1989) writers created activities to address specific outcomes, and the State Department of Education staff typed, edited, and proofread numerous drafts of the activities.

The contributions of persons and institutions listed below are greatly appreciated.

WRITERS:	Frances Arnold Auburn University at Montgomery
	Cindy Avery Tuscaloosa City Schools
	Paula Cravey Montgomery County Schools
	Donna Wolfinger Auburn University at Montgomery
PROJECT CONSULTANT:	Dale Rice Auburn University

ACKNOWLEDGEMENTS
(Continued)

COOPERATING ADMINISTRATOR:	Betty LeGrone Tuscaloosa City Board of Education

The contributions of the State Department of Education staff listed below are greatly appreciated.

SCIENCE SPECIALISTS:	Kay Atchison Suzan Dunn
EARLY CHILDHOOD SPECIALIST:	Jacquelyn Autrey
OUTSIDE CONTENT REVIEWERS:	Donna Bentley Paul Wylie
EDITORS/ PROOFREADERS:	Barbara Boland Cynthia Brown Mary Jane Herring Nell Kilpatrick Deborah Thomas Fred Wells
CHARACTER EDUCATION/ CAREER EDUCATION REVIEWER:	Frances Manning
TYPISTS:	Shirley Dorman Brondena Goldthrip Leigh Ann Kyser
GRAPHIC ARTISTS:	Brondena Goldthrip Leigh Ann Kyser

KINDERGARTEN
TABLE OF CONTENTS

Page

I. ANIMALS

Topic: Kinds of Animals

Outcome 1 - Classify animals based on their similarities.....6,8
Outcome 2 - Classify animals based on their differences..... 6,8

Topic: Helpful and Harmful Animals

Outcome 3 - Explain ways animals are useful to people (food, work, protection, and clothing).....11
Outcome 4 - Explain ways animals are harmful to people.....13

Topic: Growth and Reproduction

Outcome 5 - Observe changes in animals as growth takes place..... 16
Outcome 6 - Observe similarities between adult animals and their young.... 16,19
Outcome 7 - Observe differences between adult animals and their young.....16,19
Outcome 8 - Discuss a variety of foods that different animals eat.....16,21

Topic: Movement of Animals

Outcome 9 - Demonstrate different ways an animal moves.....23

Topic: Adaptations to the Environment

Outcome 10 - Observe different animal homes.....25
Outcome 11 - Name and describe different animal homes.....27,28
Outcome 12 - Infer kinds of animals that would live in particular habitats.....29
Outcome 13 - Explain how physical characteristics of an animal help protect it in its own environment.....31
Outcome 14 - Explain why some animals migrate to a warmer environment during winter.....34

KINDERGARTEN
TABLE OF CONTENTS
(Continued)

Page

II. PLANTS

Topic: Living and Nonliving Things

Outcome 15 - Observe and discuss differences between living and nonliving things.....37,43

Topic: Kinds of Plants

Outcome 16 - Observe and name a variety of plants.....48

Topic: Growth and Reproduction

Outcome 17 - Observe and understand that plants grow in different environments.....50
Outcome 18 - Identify the need for soil, water, and light for the proper growth of plants.....54,60
Outcome 19 - Name parts of a plant.....63,65
Outcome 20 - Discover that seeds of plants will produce like plants.....70

Topic: Helpful and Harmful Plants

Outcome 21 - Explain ways plants are useful to people (food, clothing, shelter).....74
Outcome 22 - Identify plants that are harmful to people.....79

III. AIR

Topic: Location of Air

Outcome 23 - Observe and demonstrate that air is all around.....84

Topic: Uses of Air

Outcome 24 - Demonstrate uses of air.....88

Topic: Wind

Outcome 25 - Demonstrate how wind affects objects.....91

KINDERGARTEN
TABLE OF CONTENTS
(Continued)

Page

IV. SOLAR ENERGY

Topic: Light and Heat from the Sun

Outcome 26 - Demonstrate effects of light and heat from the sun.....94

Topic: Uses of Solar Energy

Outcome 27 - Explain how solar energy can be used in homes.....95

V. WEATHER AND SEASONAL CHANGES

Topic: Daily Weather Changes

Outcome 28 - Describe daily weather conditions.....96
Outcome 29 - Illustrate different weather conditions through pictures.....98

Topic: Seasonal Weather Changes

Outcome 30 - Identify the four seasons.....100

VI. MATTER

Topic: Forms of Matter

Outcome 31 - Identify different forms of matter: solids, liquids, and gases.....103
Outcome 32 - Identify matter using the five senses.....106

Topic: Changes in Matter

Outcome 33 - Demonstrate and observe changes in matter.....106,108

KINDERGARTEN
TABLE OF CONTENTS
(Continued)

Page

VII. MACHINES

Topic: Uses of Machines

Outcome 34 - Observe use of simple machines in everyday school activities.....116,119

Topic: Effect on Work

Outcome 35 - Discover that machines are used to make many kinds of work easier.....116,119

VIII. MAGNETS

Topic: Uses of Magnets

Outcome 36 - Demonstrate use of magnets in daily living.....121

Topic: Attraction of Magnets

Outcome 37 - Demonstrate that magnets are attracted to some kinds of matter.....123

IX. CONTRIBUTIONS AND CAREERS IN SCIENCE

Topic: Contributions of Scientists

Outcome 38 - Identify men and women who have contributed to the fields of Life Science, Earth Science, and Physical Science.....127

Outcome 39 - Describe what men and women have done in the fields of Life Science, Earth Science, and Physical Science.....127

Outcome 40 - Explain why an understanding of Life Sciences, Earth Sciences, and Physical Sciences can contribute to the quality of life in today's and tomorrow's society.....127

KINDERGARTEN
TABLE OF CONTENTS
(Continued)

Page

IX. CONTRIBUTIONS AND CAREERS IN SCIENCE

Topic: Career Opportunities

Outcome 41 - Identify careers related to an understanding of Life Sciences, Earth Sciences, and Physical Sciences.....127

Outcome 42 - Explain how careers depend on a basic understanding of Life Sciences, Earth Sciences, and Physical Sciences.....127

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Kinds of Animals
OUTCOMES: 1. Classify animals based on their similarities.
2. Classify animals based on their differences.

Background

Animals can be grouped according to the number of legs each possesses. Many animals have no legs at all, such as worms and fish. Some animals have hundreds of legs, such as centipedes. Most animals of the two-legged group consist of birds and humans. Dogs, lions, frogs, and horses are some of the popular four-legged animals. Insects have six legs and spiders have eight.

Place this activity on a low bulletin board so that the students can manipulate pictures.

Materials

- Bulletin board: LOTS OF LEGS
- Animal pictures from magazines (animals with 0,2,4,6, or 8 legs)
- Push pins or peg hooks

Procedures

1. Construct headings for the bulletin board LOTS OF LEGS.

2. Use animal pictures to explain that animals are alike and different in many ways. (Some animals have no legs. Many animals have legs, but some only have two while others have hundreds.)

3. Show pictures of animals, and ask the students to name the animal and tell how many legs each animal possesses.

4. Have each student select an animal picture and attach it under the appropriate heading on the bulletin board.

Extensions

Construct other categorical headings for a bulletin board and provide appropriate pictures for students to place in the correct category.

Examples:

Land animals	Sea animals	Big birds
Big animals	Small animals	Small birds

Talk with the students at opportune times concerning ways animals are similar and different.

LOTS OF LEGS
Bulletin Board

0	2	4	6	8
worm	bluebird	dog	grasshopper	spider
whale	boy	cat	ant	
goldfish	ostrich	hippo	bee	
	girl			

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Kinds of Animals
OUTCOMES: 1. Classify animals based on similarities.
2. Classify animals based on differences.

Background

Animals can be classified into groups based on characteristics. Animals covered with fur skin are mammals. Animals covered with scaly skin are reptiles. Animals covered with feathers are birds.

Prior to the activity, construct the individual pockets and cards for each student.

Materials

- Animal pictures cut from magazines (mammals, reptiles, birds)
- Animal skin coverings (rabbit skin, snake skin, chicken feathers)
- Construction paper
- Large index cards
- Directions: INDIVIDUAL POCKETS AND CARDS
- Song: ANIMAL JACKETS

Procedures

1. Have students observe skin coverings of mammals, birds, and reptiles, and discuss the characteristics of each.

2. Have students sing the song ANIMAL JACKETS.

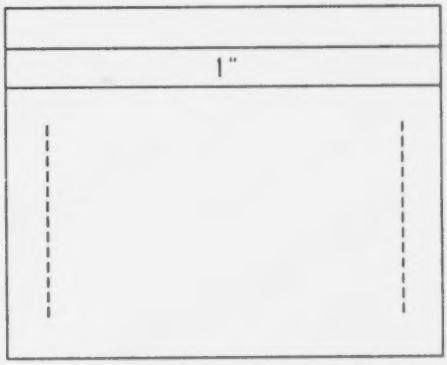
3. Distribute individual pockets and cards to each student.

4. Show students a picture of an animal. Tell students the name of the animal. Ask students to choose and display the card from the pocket that shows the appropriate skin covering.

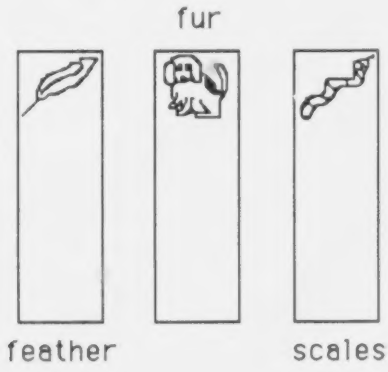
5. Have students identify how all animals are similar and how all animals are different. Help students draw a parallel to human beings.

INDIVIDUAL POCKETS AND CARDS
(Directions)

1. Construct pockets using one-half sheet of laminated construction paper. Fold ends to meet. Fold top side down one inch. Staple sides to make pocket.



2. Cut a large index card into three strips. Draw either a feather, fur, or scales on each card.



ANIMAL JACKETS (TUNE: FRERE JACQUE)
Song

Birds have feathers.
Birds have feathers.
Reptiles scales.
Reptiles scales.
Mammals have fur.
Mammals have fur.
Now we know.
Now we know.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Helpful and Harmful Animals
OUTCOME: 3. Explain ways animals are useful to people (food, work, protection, and clothing).

Background

Humans first learned about animals as they hunted them for food. Later they discovered that many animals were useful in making work easier. Humans learned to use the fur, skin, and wool to make clothing and shelters. They also learned to use dogs for protection.

Prepare a sorting board similar to the one on the following page.

Materials

- Sorting board: ANIMALS ARE USEFUL
- Animal pictures

Food	Work	Protection	Clothing
chicken	horse	police dog	sheep
cow	oxen	watchdog	cow
pig	donkey		eel
turkey	elephant		goose
fish	camel		snake
sheep	dog		pig
bee			

Procedures

1. Discuss with students ways in which animals are useful to people, emphasizing the four major ways: food, work, protection, and clothing.

2. Distribute animal pictures to the students. Display the sorting board.

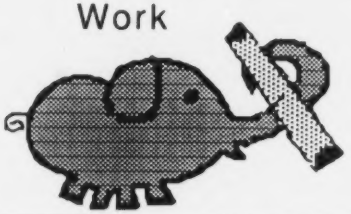
3. Allow students to classify pictures into groups by placing pictures under appropriate headings on the sorting board. Explain that several animals may be used in more than one group (sheep, cow, and pig).

Extension

See Agriculture in the Classroom: Alabama Treasures for additional information.

Animals are Useful

Sorting Board

Food	Work	Protection	Clothing
			
cow	donkey	watch dog	sheep
turkey	camel	police dog	goose

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Helpful and Harmful Animals
OUTCOME: 4. Explain ways animals are harmful to people.

Background

Some animals are harmful to people. Pets sometimes bite or scratch when frightened. Some snakes and spiders have poisonous bites that are dangerous. Some insects spread diseases and destroy crops.

Prior to the activity, construct the magic hat and rabbit situation cards. Place the cards in the magic hat.

On the rabbits, write situations similar to the following:

a. Karen and Bobby are playing near the woods. They see a small green snake. What should they do? (Possible answer: Tell an adult, because some snakes are harmful.)

b. Randy's dog followed Randy into your yard. Your dog Rags starts to growl, and then the two dogs start fighting. What should you do? Why? (Possible answer: Tell an adult, because fighting dogs sometimes bite.)

c. Pat and Sue are playing with their dog Sport. Sport has fleas. Should they take Sport into the house to play? Why or why not? (Possible answer: No, fleas may get into the house.)

d. Mandy's cat is frightened while she is holding it. The cat scratches Mandy on the arm. What should she do? Why? (Possible answer: Tell an adult.)

e. Ted's dog is chewing on a bone. Ted wants to play with his dog. What should he do? Why? (Possible answer: Wait until the dog finishes chewing its bone.)

f. While cleaning out the garage, Mary is stung on the hand by a spider. What should she do? Why? (Possible answers: Tell an adult. Periodically observe the wound. Have an adult apply medication if the wound becomes infected.)

g. Ashley is gathering flowers for her teacher. A bee stings her on the hand. What should she do? Why? (Possible answer: Tell an adult.)

OUTCOME 4 (Continued)
Background (Continued)

h. Whit and Will want to play ball in a nearby field. They notice several large anthills. What should they do? Why? (Possible answer: Find somewhere else to play, because ants may sting.)

Materials

- Directions: MAGIC HAT
- Directions: RABBIT SITUATION CARDS
- Coffee can
- Construction paper
- Glue
- Markers

Procedures

1. Discuss with students ways animals are helpful to people. Then discuss ways animals may be harmful to people.

2. Direct a student to take a situation card from the hat. Read the card for the student. Have the student respond to the situation.

3. Repeat Procedure 2 with each situation card.

MAGIC HAT

Directions

Cover coffee can with black construction paper. Cut out a ring of black construction paper to fit the top of the can to make the hat's brim. Attach the brim to the top of the can. Decorate the can with a colorful band and stars to look like a magic hat.

RABBIT SITUATION CARDS

Directions

Write the situation in the box on the rabbit.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Growth and Reproduction
OUTCOMES:
5. Observe changes in animals as growth takes place.
6. Observe similarities between adult animals and their young.
7. Observe differences between adult animals and their young.
8. Discuss a variety of foods that different animals eat.

Background

In order for young students to observe changes in growth of animals, one of two conditions must occur:

a. The animal must make relatively rapid changes.
b. The same animal must be observed periodically over a long period of time, and observations must be recorded and compared.

Observations of different animals at varying stages of development made at the same time could lead students to conclude that different animals develop differently; therefore, one animal observation over a period of time is more meaningful.

Some animals (mice, gerbils) are born with no hair and with their eyes closed. As they grow in size, various changes occur: their eyes open, and their bodies become covered with hair. Some tropical fish (swordtails, guppies) are born alive, and all look alike. As they grow in size, the males become more colorful. Fowls hatch from eggs and have a down covering. That covering is replaced with feathers as they grow. Some reptiles and insects (snakes, locust) shed their skin as they grow. Mammal young get milk from their mothers, but they begin to eat and drink on their own as they grow.
White mice, guppies, tadpoles, and gerbils all have relatively rapid growth cycles and are suitable for classroom habitation and observation.

OUTCOMES 5, 6, 7, and 8 (Continued)

Materials

- Animals
- Chart paper
- Marking pen
- Drawing paper
- Crayons or markers
- Stapler

Procedures

1. Contact parents, friends, relatives, local veterinarians, farmers, feed and seed store employees, pet store owners, or a zoo director (if one is in close proximity), and ask to be notified when an animal may be ready to produce offspring. Arrange for students to see the mother and offspring immediately after birth. To the caretaker or owner of the animals, explain the learning outcomes anticipated by a bimonthly or monthly visit with the mother animal and offspring. As the offspring mature, have the students observe changes in growth.

2. As the mother animal and offspring are introduced to the class, remind students of safe techniques for observing animals. Stress ways of handling the animals to create positive interactions. Tell students to identify specific characteristics of the animals that can be drawn and included in a class book.

3. Allow as much time for observation as possible. If the animals can visit for the day, introduce them in the morning and wait until later in the day to record observations.

4. Ask students to draw pictures of the animals on drawing paper as they make observations. Record on the students' pictures what each student has observed about the animals. (This task is accomplished more easily if completed individually or with a small group of students.)

5. At the end of the day, use the pictures to stimulate group discussion. Reflect on the observations made by the students concerning the animals. Record the observations on chart paper. Post the observations in the science center. Ask questions such as:

   a. What do you notice about the animal?
   b. How is this animal different from other animals?
   c. How does the animal react when you touch it?
   d. Where do you think the animal sleeps?
   e. What do you think the animal eats?

OUTCOMES 5, 6, 7, and 8 (Continued)
Procedures (Continued)

6. Bind the pictures into a class book, and place the book in the science center.

7. Repeat this activity throughout the year as the animal makes observable changes. During each successive experience, use the previous class books and experience charts as an introduction to facilitate comparative observations.

Extension

Relate growth of animals to growth of a child. Have parents send clothing that no longer fits their child. Ask the students to put on the clothes. When the students observe that the clothing is too small, discuss changes in growth.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Growth and Reproduction
OUTCOMES: 6. Observe similarities between adult animals and their young.

7. Observe differences between adult animals and their young.

Background

Most animal young look like their parents, only smaller. Some young do not look like their parents at all, such as a butterfly and a caterpillar.

A field trip to a local farm or to a county fair exhibit would give the students an excellent opportunity to observe similarities and differences between adult animals and their young.

Construct a farm bulletin board similar to the one on the following page. Place adult animal pictures on the farm scene.

Materials

- Farm bulletin board: ARE YOU MY MOTHER?
- Are You My Mother?, Eastman, P.D.
- Push pins
- Animal pictures such as:

cow/calf	sheep/lamb
horse/foal	goat/kid
pig/piglet	dog/puppy
chicken/chick	cat/kitten
duck/duckling	

Procedures

1. Read Are You My Mother? to students. Discuss with students how the little bird tried to find its mother. Have students discuss ways the little bird was similar and different from the things it thought were its mother.

2. Direct students to match the young farm animals to their mothers by placing them together on the farm bulletin board with push pins.

3. Ask students to discuss ways the young farm animals are similar and different from their mothers.

Farm Bulletin Board

ARE YOU MY MOTHER?

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Growth and Reproduction
OUTCOME: 8. Discuss a variety of foods that different animals eat.

Background

Animals can be herbivorous, eating only plants; carnivorous, eating only meats; or omnivorous, eating a combination of both. Some birds (kingfishers, gulls, pelicans) eat fish; some birds (goldfinches, parakeets, cardinals, titmice, chickadees) eat seeds; and some birds (woodpeckers, wrens, bluebirds, towhees) eat insects. Frogs, toads, and lizards eat insects. Gerbils, hamsters, rabbits, and guinea pigs eat lettuce, carrots, apples, and cabbage. Pets often eat food prepared especially to meet their nutritional needs and keep them healthy.

This activity includes a field trip. The trip will provide first-hand experience for the students. Be sure to observe safety precautions.

Materials

- Cards, 4" x 6"
- Pictures of animals
- Glue
- Animal food samples

Procedures

1. Take a field trip to a pet store, the office of a veterinarian, a zoo (if in close proximity), or a farm where several kinds of animals are located. Ask the owners to let the students help feed the animals.

2. Ask owners for samples of each type of food the animals eat.

3. Upon returning to the classroom, discuss the different animals students saw and the types of food they ate.

   Ask questions such as:

   a. What animals did you see?
   b. Which animal did you like best? What did you like best about that animal?
   c. What did that animal eat?
   d. What other animals do you think might eat the same food?
   e. What makes you think that?
   f. What animal would you like to be? Why?

OUTCOME 8 (Continued)
Procedures (Continued)

4. Have the students glue the food samples on separate 4- by 6-inch cards.

5. Have students match the food sample cards to pictures of the animals that have been glued on other cards. (The first picture cards could be of animals seen on the field trip. Animal cards could be added as the students expand the concept.)

Extension

Spray the food samples with clear polyurethane for preservation, and store them in a plastic bag to prevent infestation.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Movement of Animals
OUTCOME: 9. Demonstrate different ways an animal moves.

Background

All animals move from place to place. Some animals, such as barnacles, move very little. Some animals, such as sparrows, fly thousands of miles to avoid cold weather.

Animals move in a variety of ways. Some animals move slowly, while others move quickly. Animals may walk, run, hop, swim, leap, crawl, fly, waddle, trot, or slither.

Animals move for many reasons. They move to get food, to build homes, to meet other animals, or to defend themselves. Observation of real animals would be the best method of teaching locomotion to young students. If this is not possible, media may be used. Check local libraries or media centers for recommended media on animal locomotion. Prepare face puppets similar to the ones on the following page.

Materials

- Face puppets
- Various books, films, filmstrips, or video cassettes on animal locomotion

Procedures

1. Allow students to observe real animal movements or view various media presentations of animal locomotion.

2. Allow a student to choose an animal face puppet without knowledge of which animal puppet was chosen and place the puppet to his or her face.

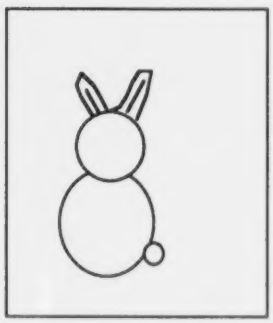
3. Direct the student with the puppet to ask questions about that animal's method of movement (How do I move?). Allow other students to give method(s) of movement. Allow the student with the puppet to guess what animal puppet was chosen.

4. Have the student demonstrate the method(s) of movement of the animal puppet.

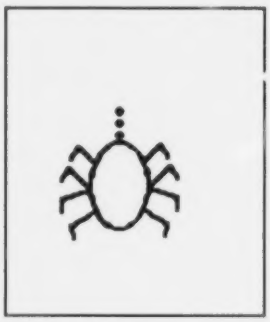
23

FACE PUPPETS

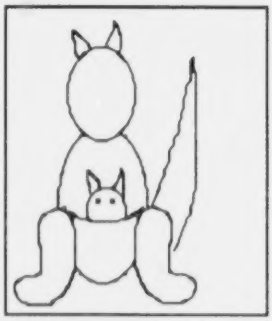
Draw the animals on 1/2 pieces of poster board and cut out the faces.



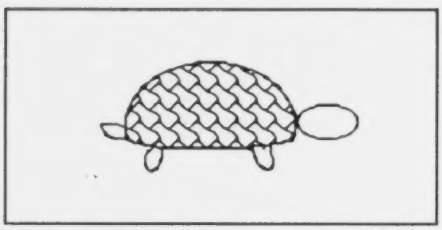
rabbit



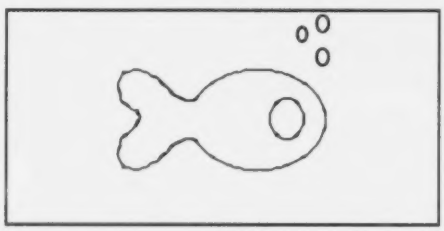
spider



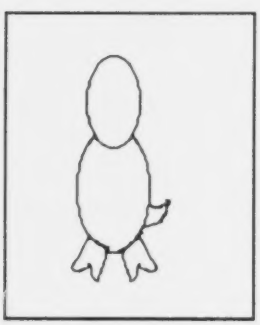
kangaroo



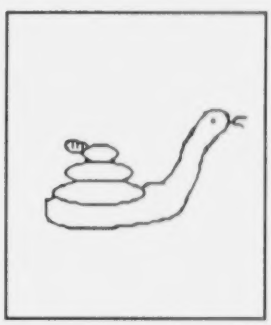
turtle



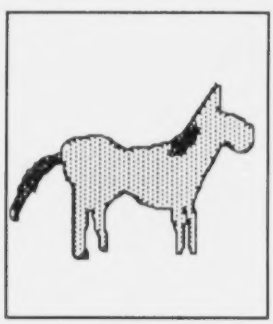
fish



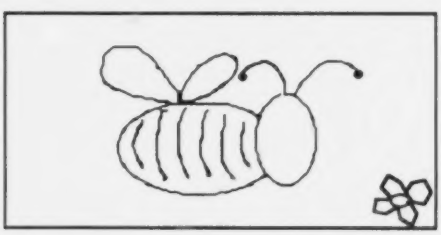
duck



snake



horse



bee

cheetah

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Adaptations to the Environment
OUTCOME: 10. Observe different animal homes.

Background

Many animals spend most of their time moving from one place to another. Many animals have or build homes to protect themselves from the weather or to raise their young. These homes vary greatly from a nest made from twigs to an enormous colony for prairie dogs that may cover several square miles.

Students should be given an opportunity to observe animal homes in nature. A parallel may be drawn with the many varieties of homes humans inhabit.

Materials

- Bird nests, several made by different kinds of birds
- Wasp nest
- Turtle shell
- Snail shell
- Honeycomb
- Ant farm
- Aquarium
- Magnifying glass
- Pictures: bird, wasp, turtle, snail, bee, fish, and ants

Procedures

1. Display the different animal homes in a science center.

2. Provide students with an opportunity to examine each of the animal homes. Direct students to use the magnifying glass to get a closer look.

3. Show animal pictures and ask students which homes might be appropriate for each animal. Direct students to place each animal's picture in or near the correct home.

4. Have students compare the homes by asking questions similar to the following:

    a. Which animals made their homes? (The bird, wasp, bee, and ant made their homes.)
    b. Which animals carry their homes with them? (Turtles and snails carry their homes on their backs.)
    c. Why wouldn't a nest be a good home for a fish? (A fish needs to live in water.)

OUTCOME 10 (Continued)

Extension

Have students collect an assortment of colorful yarn, string, ribbon, and paper. Let students place these items outside in the early spring in a loose-net bag. Direct students to look for a bird nest that contains string, yarn, ribbon, and/or paper that may have been taken from the net bag by the birds.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Adaptations to the Environment
OUTCOME: 11. Name and describe different animal homes.

Background

Some animals have or build homes to protect themselves from the weather. Some animals build homes to raise their young. Some animals have permanent homes. Most animals, even those which do not have homes, usually live within certain boundaries. This activity works best with a small group of two to four students. The activity is played like the game "Concentration."

Materials

- Animal cards and home cards:

turtle/shell	groundhog/burrow
bird/nest	beaver/dam
lion/den	chicken/coop
pig/sty	bear/cave
bee/hive	owl/hollow tree

Procedures

1. Distribute the animal cards and home cards to a small group of students. Direct students to place the cards face down on a table in random order with the animal cards in one line and the home cards in another line.

2. Direct students to take turns turning over one animal card and one home card. Ask students to match the appropriate home with each animal. If the correct match is not made, have students turn the cards face down again for the next student's turn.

3. Ask students to name and describe each animal home.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Adaptations to the Environment
OUTCOME: 11. Name and describe different animal homes.

Background

Many animals have permanent homes. They build their homes or their homes are provided for them by nature or humans. These homes provide a place for protection or a place to raise their young.

This should be a follow-up activity after previous discussion of different animal homes.

Materials

For each student:

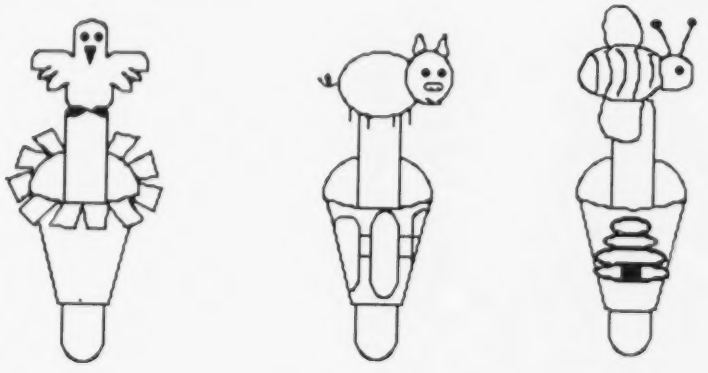
- Hot/cold plastic or paper cup
- Tongue depressor
- Construction paper or felt

Procedures

1. Direct each student to choose an animal and its home to illustrate with a cup puppet.

2. Distribute materials to each student. Direct each student to decorate the outside of the cup as an animal home, such as a hive, sty, or a nest. Direct each student to draw an animal that would live in that home and glue the animal picture to the end of the tongue depressor. Direct each student to puncture the bottom of the cup and slide the tongue depressor into the hole.

3. Direct each student to use the puppet cup to describe the animal home. Ask each student to tell why this type of home suits the animal.



KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Adaptations to the Environment
OUTCOME: 12. Infer kinds of animals that would live in particular habitats.

Background

While some animals are found in several different habitats, most are indigenous to one habitat. This activity involves a classroom of students as they explore the playground to discover that animals live in the different habitats found on the playground. Some habitats that may be found are in a tree, in dry soil, in moist soil, under decaying leaves or logs, on the grass, and on the ground. Animals found in these various habits may include insects, worms, centipedes, millipedes, and spiders.

A reference book, such as Zim's Insects, will provide help in identifying specific specimens.

On poster board or a bulletin board, prepare a graph similar to the one below. Use locations that are appropriate to the types of habitats that are present on the playground.

Ground	Under Cover	Dry Soil	Moist Soil	Tree

Materials

- Small shovel
- Hand trowels (3)
- Graph poster or bulletin board
- Chart paper
- Marking pen

For each student:

- Plastic bag

OUTCOME 12 (Continued)

Procedures

Use a marking pen to write each student's name on a plastic bag. As samples are collected, use the marking pen to indicate where the samples were taken. Encourage the students to share their finds with the students who are not as adept at "critter hunting."

1. Give each student a plastic bag with his or her name on it.

2. Tell students they are going to the playground for a "critter hunt." Explain that students are to collect representative samples of the "critters" found on the playground. Instruct students to take only one "critter" of each kind and leave the remaining "critters" in their natural homes.

3. Caution students about animals that may harm them, and instruct students to ask an adult before they touch a strange "critter," such as a spider or a millipede.

4. Take the class to the playground. Have students look first for "critters" on top of the ground. Have students place the samples in the plastic bags. Label the plastic bags "ground."

5. Next, have students turn over rocks, bricks, or stumps and collect samples of "critters." Place the samples in their plastic bags. Label the plastic bags "under cover." Have students continue searching the various habitats and collecting specimens. Label the plastic bags with the names of the animals' habitats.

6. Upon returning to the classroom, staple the plastic bags to the graph poster or bulletin board to indicate how many "critters" were found in each habitat.

7. Ask the students the following questions:

   a. Where did we find the most "critters"?
   b. Do you see any "critters" that look somewhat alike?
   c. Is there any way to tell where a "critter" lives just by looking at it?

8. Return the "critters" to their natural habitats that afternoon.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Adaptation to the Environment
OUTCOME: 13. Explain how physical characteristics of an animal help protect it in its own environment.

Background

An anole (false chameleon) is a common type of lizard that lives around plants and eats insects. Some birds and cats eat anoles; therefore, nature has provided the anole with a protective devise. That device is the ability to change colors to match the environment. This process enables the anole to blend with its surroundings and to be camouflaged, thus protecting it. Anoles are frequently found in ivy or around decks or shrubs.

This is a three-day to one-week activity. The introduction of the visitor (anole) should be made to the total group. Observations and recordings of those observations should be in small groups of three to five students.

Materials

- Aquarium, without water and with a screen-wire top
  or
  Clean milk jug or carton, pantyhose, and knife
  or
  Critter box
  or
  Cricket box
- Anole
- Small jar lid
- Jar
- Twister tie
- Chart paper
- Marking pens

Procedures

1. Search around shrubs, ivy, or monkey grass for an anole.

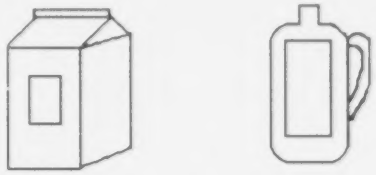
2. Catch an anole by scooping it into a jar. If an anole cannot be found, ask parents to assist in the search at their homes.

3. Tell the class that a special animal will visit for a few days and must have care. Introduce the anole to the class. Ask students to watch the visitor to see if it has anything special it can do.

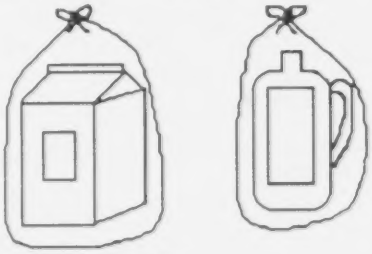
OUTCOME 13 (Continued)
Procedures (Continued)

4. Have the students prepare a home for the anole by placing green leaves, grass, and a small jar lid of water in either of the following homes:

   critter box
   cricket box
   aquarium with screen-wire top
   clean milk carton or jug



If a milk carton or jug is used, cut a viewing hole in the container and cover it with a pantyhose leg. Tie the pantyhose on top with a twister tie.



5. Ask small groups of students questions such as:

   a. What do you see?
   b. What is the anole doing?
   c. Can you tell me what the anole looks like? (Hopefully, the anole will adapt to the color of the green background.)

6. Record the students' observations on chart paper in manuscript writing.

7. Place the chart in the science area next to the anole.

8. After the first set of observations have been made, ask the students to find brown twigs and bark from outside. Remove the green items in the anole's home and replace them with brown items.

9. Repeat Procedures 4 through 6. Ask the following questions:

   a. Do you notice anything different?
   b. If so, what do you see that is different?
   c. How do you think that helps the anole? (Hopefully, the anole will adapt to the change in background by changing color.)

OUTCOME 13 (Continued)
Procedures (Continued)

10. Discuss the protective technique the anole uses in its environment by comparing the two charts of observations. Conduct this summary with the total group.

11. If the anole is kept for several days, ask the students to find insects to feed it.

12. Release the anole into its natural environment within five days.

Extensions

Use a promethea moth (or photograph of one) to demonstrate how the large, black spots on its wings make birds think the moth is a larger animal.

Use a walking-stick insect or a leafhopper grasshopper to demonstrate how some animals look like their environment.

Demonstrate how humans make themselves inconspicuous in their environment by wearing camouflage clothing when they are hunting.

KINDERGARTEN
LIFE SCIENCE

UNIT: Animals
TOPIC: Adaptations to the Environment
OUTCOME: 14. Explain why some animals migrate to a warmer environment during winter.

Background

Monarch butterflies migrate an extended distance each year. Even though experts do not completely understand the reasons, the migration occurs on a seasonal cycle. Monarchs in the eastern United States leave their northern homes in the fall and travel to warmer climates in Mexico. This trip involves crossing the Gulf of Mexico. After many of the monarchs reach their destinations, they hang from trees and shrubs en masse. There they produce their young, and the metamorphosis cycle of egg, caterpillar, chrysalis (pupa), and adult occurs. Monarchs are easily observable throughout Alabama, and their appearance is one of the first signs of fall.

Other animals that migrate through Alabama are goldfinches, purple finches, evening grosbeaks, robins, purple martins, cedar waxwings, and northern meadowlarks.

Young students should not be expected to understand all the facts about metamorphosis and migration. Young students can understand that some animals leave cold climates, and even small animals can travel long distances.

This activity is recommended for small groups of students when there is adequate time for questions and discussion. This activity is a follow-up to an early fall walk.

Prior to this activity, place a large branch in a flowerpot or coffee can. Secure the branch in the pot or can with soil or plaster of Paris. The craft clothespins may be sprayed black prior to the activity.

Materials

- Chart paper
- Marking pen
- Black spray paint (optional)
- Large branch
- Book about monarch butterflies and their migration
- Flowerpot or coffee can

OUTCOME 14 (Continued)
Materials (Continued)

For each student:

- Orange tissue paper, 2" squares (2)
- Small craft clothespin (from arts and crafts shop)
- Black pipe cleaner, 4"
- Glue
- Black marking pens

Procedures

1. During the early fall when monarch butterflies are observable, take the students on a walk around the school yard on a "butterfly hunt." (Monarch butterflies are found at the same time the yellow butterflies are prevalent.)

2. Ask questions such as the following:

   a. Have you ever made a long trip?
   b. How did you feel when you arrived at your destination?
   c. Why did you make the trip?

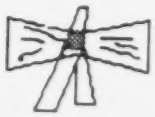
3. Record the answers and the students' comments on chart paper.

4. Read an appropriate book about monarch butterflies and their migration.

5. In small groups, have students make monarch butterflies as follows:

   a. Crumple the middle of each square of orange tissue paper.

   b. Glue the centers to the clothespin.



   c. Attach pipe cleaners as antennae to the clothespin with glue, or twist around the clothespin.

   d. Mark the tissue to look like a monarch butterfly.

OUTCOME 14 (Continued)
Procedures (Continued)

6. Instruct the students to clip their butterflies to the tree branch. (It is acceptable for some of the butterflies to be upside down on the "tree.")

7. Discuss the flight of the monarch butterfly with the students. (See background information.)

8. Ask questions such as:

   a. Why do you think the monarch travels south in the fall?
   b. How do you think they feel?

9. Read the chart during review time at the end of the day.

Extensions

Tell the story of Snow Goose.

Look for other animal migrations to observe.

Attract migrating goldfinches and purple finches with feeders of sunflower seeds and thistle.

KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Living and Nonliving Things
OUTCOME: 15. Observe and discuss differences between living and nonliving things.

Background

Living things grow, move, reproduce, react, and utilize food. Most kindergarten students know that an animal is "alive." They may have difficulty understanding that plants also live. This activity encourages students to make a comparison between animals and plants. It directs students to the conclusion that a whole plant is alive. A leaf, although alive, is only part of a living thing and cannot live alone.

The student in the story entitled "A Most Unusual Pet" does not have a name. The sex of the child may be changed if desired. Prior to the activity, use felt, markers, and the available patterns to make the STORY CHARACTERS and APARTMENT BUILDING.

The activity will take one class period (about twenty to thirty minutes). It can be extended over the period of a month if graphing is used.

Materials

- Flannel board
- Felt
- Markers
- Patterns: STORY CHARACTERS
- Pattern: APARTMENT BUILDING
- Grocery bag
- Potting soil
- Seeds (fast-growing, such as lima bean or marigold seeds)
- Flowerpot or container suitable for a growing plant
- Stuffed animals
- Chart: PLANT OBSERVATION

Procedures

1. Bring, or have students bring, a variety of stuffed animals to school. Display the stuffed animals near a large group area.

2. Lead a discussion about the collection of stuffed animals by asking questions such as:

   a. How are these alike?
   b. How are they different?

c. Which do you like best? Why?
d. Are they alive?
e. How can you tell? (If the students have trouble with this, ask them if the stuffed animals grow, move, reproduce, react, or utilize food.)

3. Read the following story, and place figures on the flannel board when appropriate.

A Most Unusual Pet

Once there was a little girl who wanted to have a pet more than anything. (Place the little girl figure on the board.) Her mother wanted her to have a pet too. They lived in a big apartment building and were not allowed to have any animals in the building. (Place the apartment building figure on the board.)

One day the little girl's mother came home with a present for the little girl. She said, "Here is a pet for you that you can keep in the apartment." When the little girl opened the present, she found a cute little stuffed animal. (Place the small stuffed animal next to the flannel board.) The little girl loved it! She named it Happy and carried it around with her wherever she went.

A few days later the little girl called her mother and said, "I love Happy, but I wish I had a pet that I could love and feed. Happy does not eat, move, or grow. I wish Happy were alive." Her mother understood and said, "I have an idea. When I come home tomorrow, I will have a living thing for you."

The next day the little girl could not wait for school to be over so she could go home and see her new pet. Finally, the day was over and she went home. Her mother was there with the surprise. She was smiling. On the table was a brown grocery bag. (Produce a bag that has been hidden.) The little girl ran to the bag and tore it open. She was very surprised to see a bag of soil and a flower pot inside. (Take the potting soil and pot out of the bag and place them on a shelf near the flannel or bulletin board.)

"What is this?" she said. "I thought you were bringing me a living pet." "I did," said her mother. "Here it is!" She pulled her hand out of her pocket and opened it for the little girl to see. In her hand was a seed. (Pull the seed out of a pocket or bag.) She said, "Here is a living thing. Plant it in the soil, put it in the sunshine, and give it water and a little of this plant food. It will grow, eat, and turn toward the sun." The little girl did, and the plant grew to be big and strong. It wasn't an animal pet, but it was a living thing. It made her very happy to see it grow.

OUTCOME 15 (Continued)
Procedures (Continued)

4. Demonstrate how to plant a seed using the potting soil and pot revealed during the story. Name and label the potted plant. Place it in a sunny location, and let the students help care for it.

5. Using the chart PLANT OBSERVATION, keep a daily log of the plant's growth progress for a month.

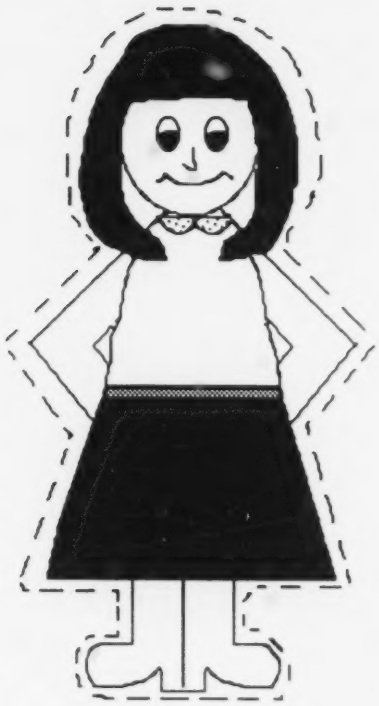
Extensions

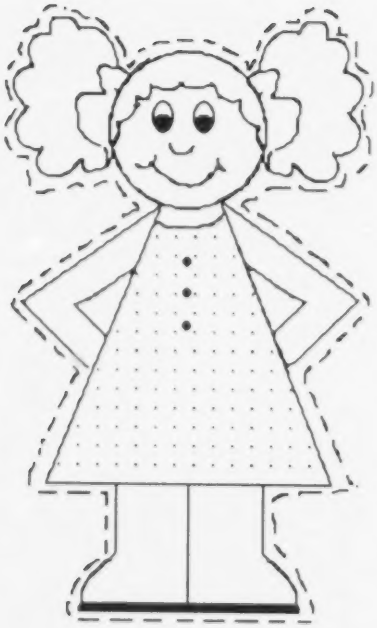
Make a graph to chart the growth of the plant.

Have the students keep a journal of drawings to show the growth and changes in the plant.

Buy or make a picture sequence game showing the growth of a plant.

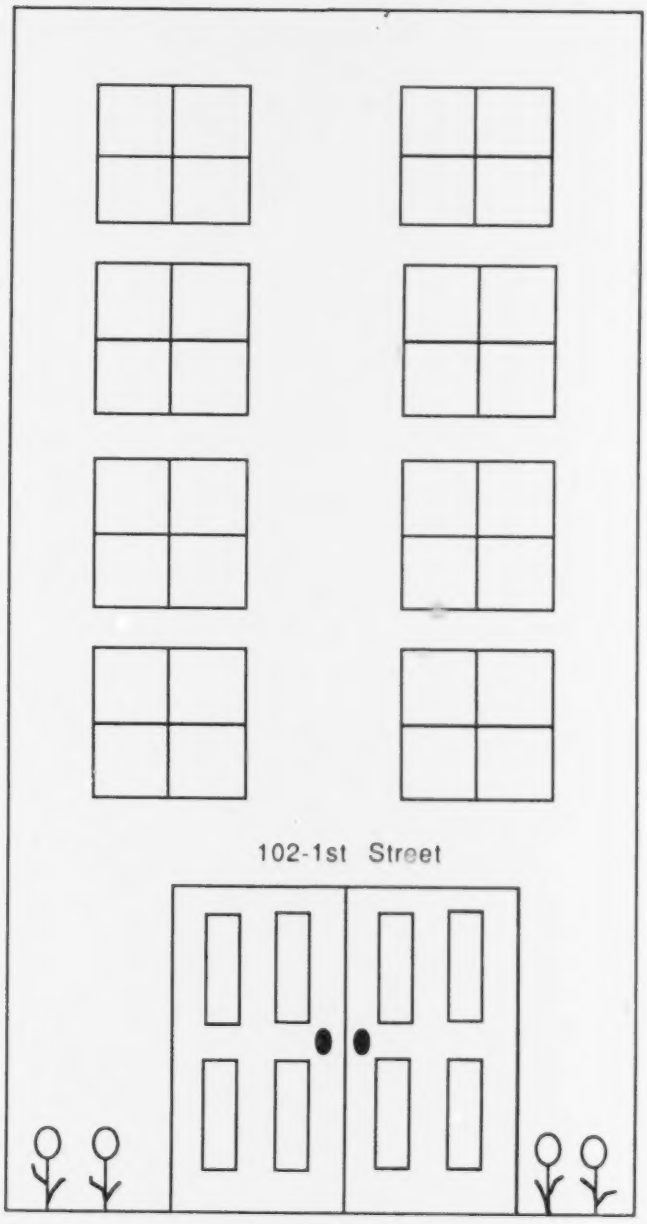
STORY CHARACTERS
Patterns





OUTCOME 15 (Continued)

APARTMENT BUILDING
Pattern



PLANT OBSERVATION CHART

	Week 1	Week 2	Week 3	Week 4
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				

KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Living and Nonliving Things
OUTCOME: 15. Observe and discuss differences between living and nonliving things.

Background

Plants and animals are living things. They grow, move, reproduce, react, and utilize food. Objects do not do these things. In this activity, the students classify pictures as animals, plants, or objects.

Color the pictures on the category cards. Place the cards on a bulletin board or mount them on free-standing cards for a table game. Mount pictures of plants, animals, and objects on index cards. Find a variety of pictures, photographs, and drawings of each category to add difficulty to the game. Science magazines, catalogs, old science workbooks, and old textbooks are good sources. Picture cards and category cards may be color-coded to make the activity self-checking.

Materials

- Picture cards: animals, plants, and objects (10-15 each)
- Category cards: Object, Plant, and Animal
- Bulletin board or table
- Baskets or large envelopes

Procedures

1. During a large group discussion, talk with students about living and nonliving things. Ask questions such as:

   a. How do you know if something is alive? (Lead students to include all the characteristics of living things found in the Background.)
   b. Can you name some things that are alive? (Lead students to include plants.)
   c. Can you name some things that are not alive?

2. Show students the category cards and give them the names for the three categories: Plant, Animal, and Object. Place each category card in a separate basket or envelope.

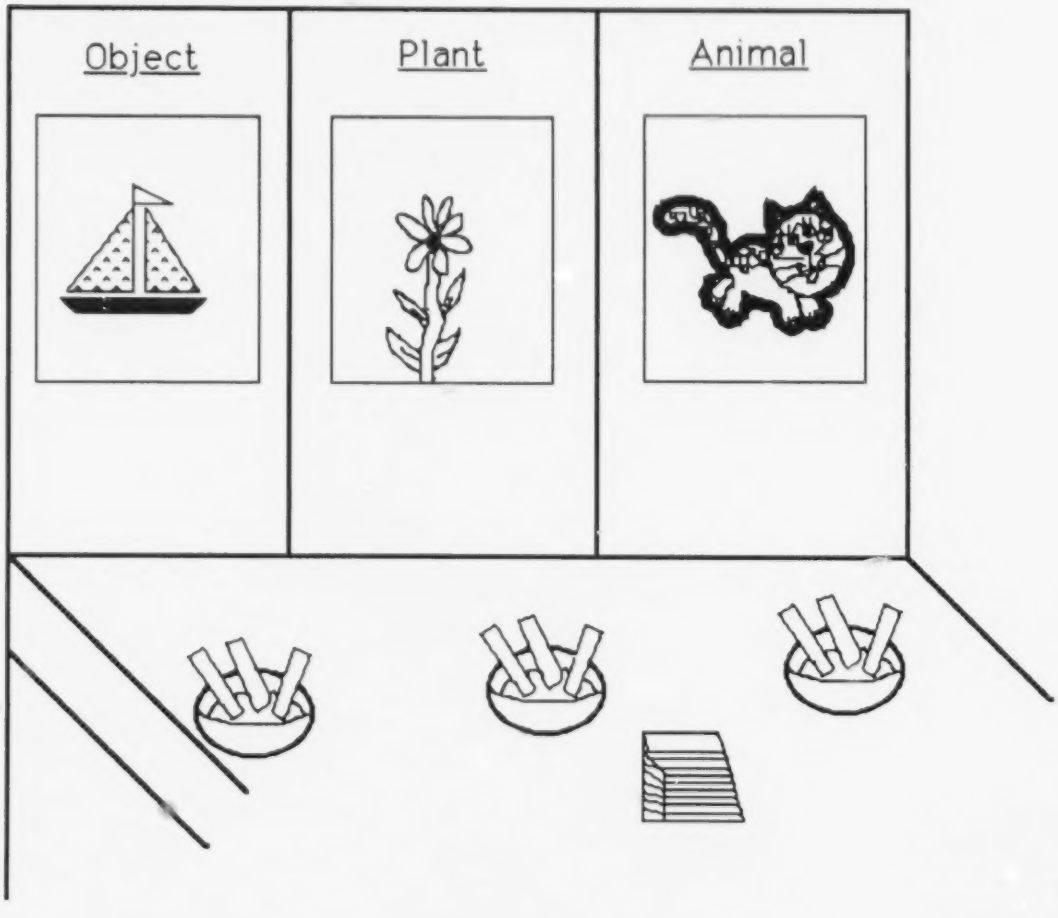
OUTCOME 15 (Continued)
Procedures (Continued)

3. Model the activity for the students by placing two or three picture cards in the correct basket or envelope. Direct several students to place the picture cards in the appropriate basket or envelope. Show students the colors on the backs of the activity cards if they have been color-coded. (If the cards have been correctly sorted, all the cards in each category will be the same color when they are turned. Place the activity in a learning center. Demonstrate how to put the materials away.

Extensions

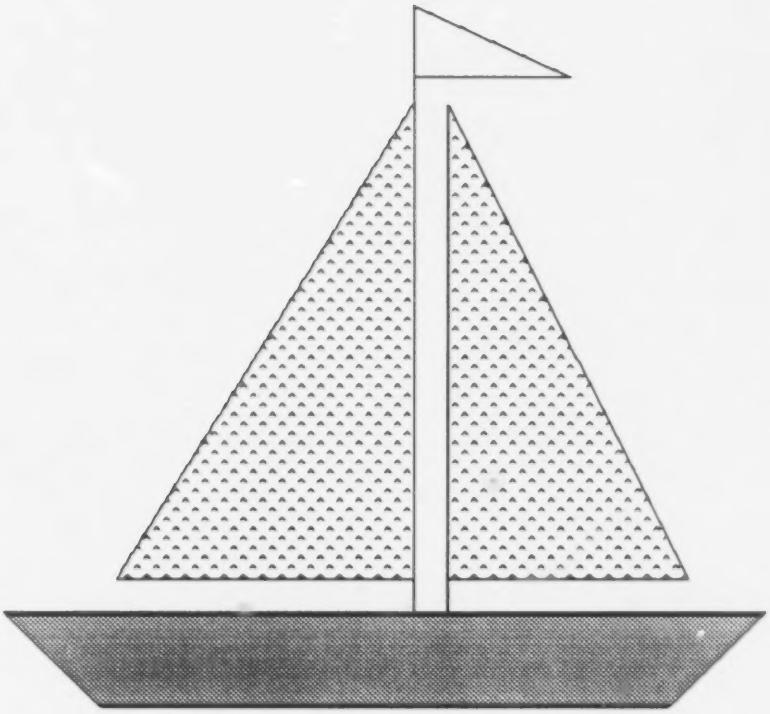
Make plant, animal, and object drawings from the pictures, and display them on a bulletin board.

Make a graph of plants, animals, and objects from the classroom.



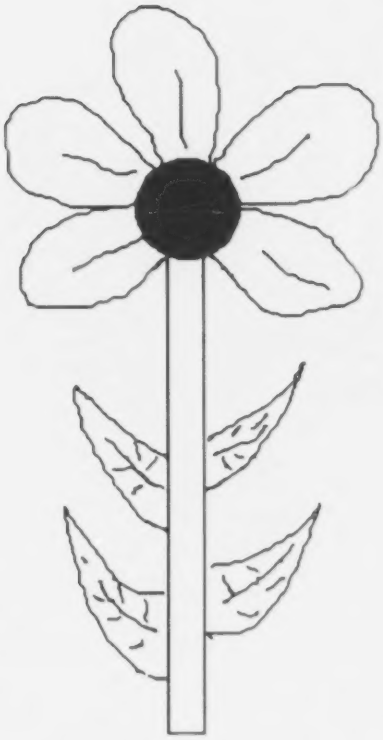
Category Card

Object



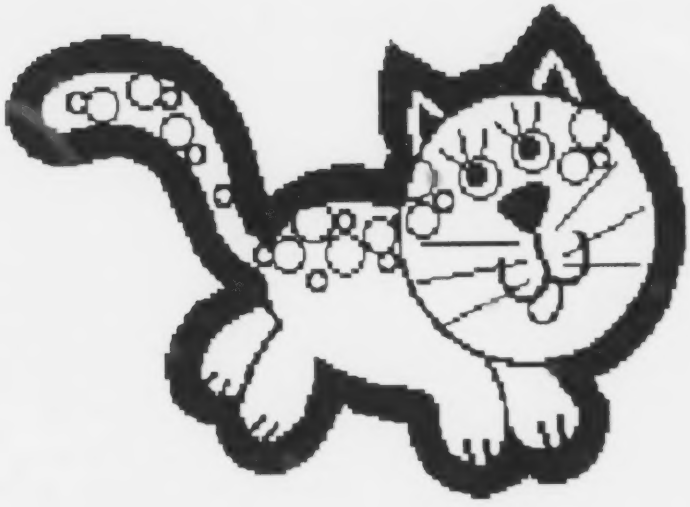
Category Card

PLANT



Category Card

ANIMAL



KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Kinds of Plants
OUTCOME: 16. Observe and name a variety of plants.

Background

Numerous types of plants grow in the ground. Some plants, such as mosses and lichen, do not grow in the ground. Many microscopic plants that cannot be seen do not grow in the ground.

Differences and similarities in plants can be readily observed by kindergarten students. This activity involves a visit to the playground. Scout the playground to find an area that has a variety of plants that students can observe and collect. In advance, cover a bulletin board with colored paper. With a marker, write a title at the top of the paper such as "There Are Many Different Kinds of Plants." Find a picture of an outdoor scene, and tape it to the center of the paper.

Materials

- Poster or photograph of an outdoor scene containing no animals or people
- Colored paper to cover bulletin board (any color except green)
- Marker
- Masking tape or scotch tape
- Grocery bag
- Scissors or plant shears

Procedures

1. Show students the poster or photograph of an outdoor scene. Discuss the picture by asking questions such as:

   a. What do you see in the picture?
   b. What do you see that is living? (Plants)
   c. Are they all the same?
   d. How are they different? (Color, shape, size)

2. Explain to the students that plants are different in many ways and that there are numerous types of plants.

OUTCOME 16 (Continued)
Procedures (Continued)

3. Show students the grocery bag, and tell them they are going on a plant hunt around the school to find samples of different kinds of plants. Talk about plants being living things. Explain that taking a leaf or stem from a plant will not hurt it, but pulling a plant out of the ground will kill it. Encourage the students to take only one leaf or stem from a plant.

4. Take the students outside to a pre-determined area, and let the students gather leaves, stems, bark, grasses, twigs, nuts, mosses, or lichens to place in a bag. Use scissors to cut anything that students cannot break with their fingers.

5. Return to the classroom, and empty the contents of the bag on a table or floor area where all students can observe. Discuss with students the similarities and differences in the specimens.

6. Give each student tape, and instruct him or her to tape a specimen to the plant mural on the bulletin board.

KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Growth and Reproduction
OUTCOME: 17. Observe and understand that plants grow in different environments.

Background

Different kinds of plants grow in different environments. Some plants need a warm, moist environment while others need a dry, hot environment. Plants grow in forests, grasslands, deserts, oceans, and ponds. Plants grow on rocks, trees, frozen tundra, and mountains. A fungus is a plant-like organism that feeds on living organisms or dead organic matter.

In this activity, students will discover that they can grow a "forest" or mold on a piece of bread. Molds grow from spores that are present in the air. When molds come in contact with a warm, moist environment, they begin to grow. Growth begins when the spore sends out tiny, string-like legs that attach to the bread and grow down or up. These threads spread and multiply and can be seen as fuzzy mold on bread or other foods.

Completion of this activity will take several days. Students will enjoy repeating the finger play several times while waiting for their mold to grow.

Materials

- Spray bottle
- Water
- Permanent color markers
- Large box with top

For each student:

- Handout: BREAD MOLD
- Self-sealing plastic bag
- Bread (1 slice)

Procedures

1. Explain to students that some plants grow from seeds, some from roots, some from stems, and some from tiny dust-like specks called spores. Explain to students that there are millions of spores in the air that are not visible. Point out that when these tiny spores land on a warm, moist place, they begin to grow by sending out tiny threads. They grow in all directions similar to a net.

OUTCOME 17 (Continued)
Procedures (Continued)

2. Ask students questions such as:

   a. Have you ever seen mold growing on food? (Most students will say yes.)
   b. What did it look like? (Answer could be "dark fuzz.")
   c. How did it get there? (It grew.)

3. Distribute a slice of bread and a plastic bag to each student. Explain to students that bread mold grows from a spore that is present in the air. Tell students that when the spore lands on a warm, moist piece of bread, it will begin to grow. Explain that a spore grows best in a dark, moist, warm environment.

4. Have students write their names on the bags with permanent markers.

5. Let each student use the spray bottle that has been filled with water to moisten the bread. (Two squirts should be sufficient.)

6. Instruct students to place the bread slices on top of their plastic bags. Have the students place their bags and bread on a desktop or countertop. Tell students that the bread slices need to be left in place for about an hour to "gather spores."

7. While waiting for the bread to gather spores, teach the following poem and dramatize as indicated:

" THE FOREST"

I was a little mold spore,	(Make bodies small.)
Floating all around.	(Flutter fingers all around.)
A nice warm, moist home	(Clasp hands together.)
Is what I found.	
I floated and I drifted.	(Flutter and move fingers.)
Till I touched down.	(Touch knees with fingers/ hands.)
A nice soft piece of bread	(Hold hand out, palm up.)
Is where I made my bed.	(Lay other hand on top.)
My tiny stringy legs	(Lace fingers together.)
settled right in.	
Some went up and some	(Hold some fingers up,
went down.	some down.)
I grew and I spread,	(Open hands slowly and spread fingers.)
And now I'm a plant in	(Hold index finger up.)
a tiny forest,	
On a piece of bread.	(Hold hand out, palm up.)

OUTCOME 17 (Continued)
Procedures (Continued)

8. Instruct students to place their pieces of bread carefully into their plastic bags. Have students seal their bags and place them in the box. Cover the box with a top and place it in a warm place.

9. After several days, open the box and examine the bread. Do not allow students to open the bags. Have each student draw his or her "mold forest" on the handout BREAD MOLD. Save the handouts.

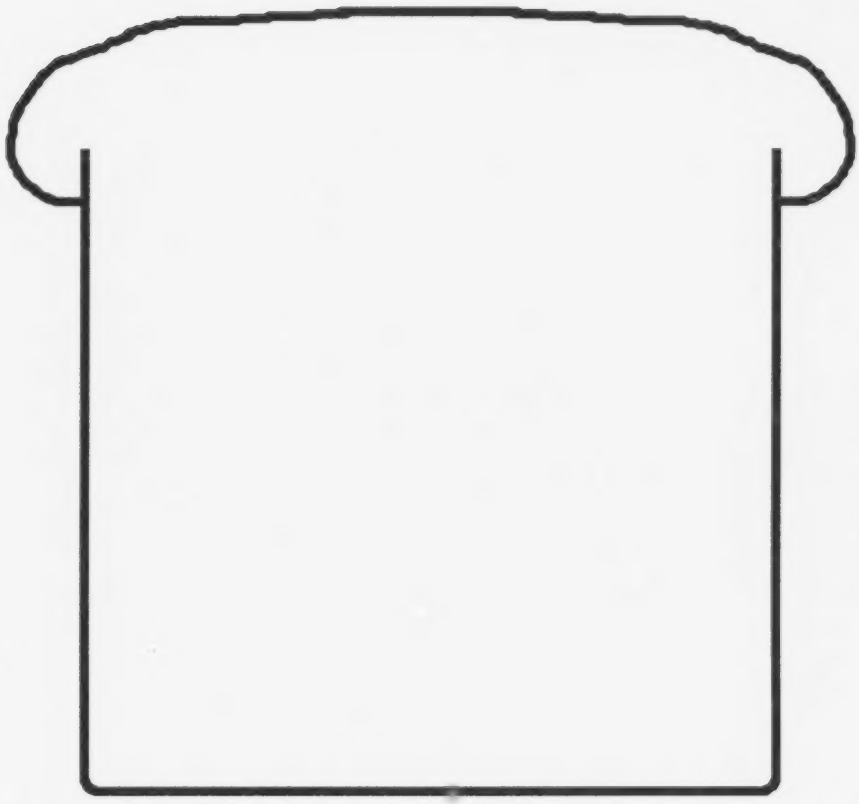
10. Return the bags to the box for a few extra days. If black spore clumps become evident, have students add this element to their drawings.

11. For safety reasons, do not allow students to carry their moldy bread home. At the end of the activity, throw the bread away.

Extension

Sample Roquefort and bleu cheese. Explain that not all molds are harmful. Some molds are used to make cheese and other foods.

BREAD MOLD
Handout



KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Growth and Reproduction
OUTCOME: 18. Identify the need for soil, water, and light for the proper growth of plants.

Background

Plants need water, soil, and light to grow. Most plants make their own food using raw materials from the soil and energy from the sun. Chlorophyll, a green pigment present in leaves, gathers light rays that combine with water and carbon dioxide to make simple sugars. The sugars feed the plant and make it grow. The song learned in this activity will help students remember the things needed to grow a plant.

Use the patterns with this activity to construct felt flannel-board pictures. Directions for each are listed on the pattern.

The activity will take approximately fifteen minutes. The students will enjoy repeating the activity several times over a period of a few days.

Materials

- Brown felt, 9" x 12"
- Tan felt, 3" x 3"
- Green felt, 9" x 12"
- Yellow felt, 6" x 6"
- Blue felt, 6" x 6"
- Marker
- Scissors
- Song: BEAN SEED
- Flannel board
- Needle
- Thread
- Patterns and directions for felt figures

Procedures

1. Tell students that plants need soil, light, and water to grow. Discuss this concept by using questions such as:

    a. Where do plants get light? (Plants get light from sunshine or lightbulbs.)
    b. Where do plants get water? (Plants get water from rain, a water hose, or a sink.)

OUTCOME 18 (Continued)
Procedures (Continued)

c. What is soil? (Soil is dirt. Plants get food from soil.)
d. Where do plants get soil? (Plants get soil from the ground or potting soil.)
e. How do plants get into the soil? (They fall onto the ground or someone plants them.)
f. What happens if they do not get water, light, or soil? (They do not grow.)

2. Teach the following song to students. Place felt pieces on the flannel board as indicated in the song.

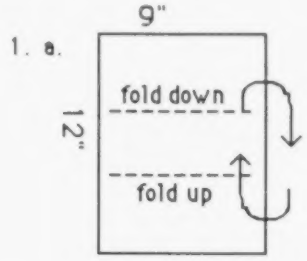
BEAN SEED
Song
(Tune: "I'm a Little Teapot")

	(Place the brown soil pocket on the flannel board.)
I'm a little bean seed,	(Place the bean on the flannel board.)
Nice and dry.	
Please won't you plant me	(Place the bean in the soil pocket.)
In some soil.	
Next I need some raindrops,	(Place water drops above the soil on the flannel board.)
Then a little sun.	(Place the sun above the soil.)
Out I'll pop,	(Slowly pull out the vine that has been hiding in the pocket.)
And grow, grow, grow.	

OUTCOME 18 (Continued)

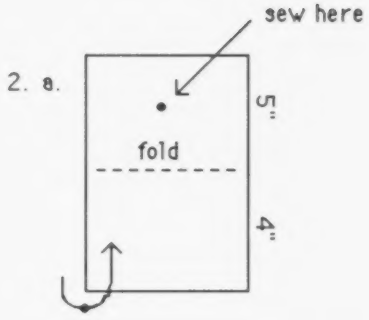
PATTERNS AND DIRECTIONS

1.a. Fold 9" x 12" piece of green felt.

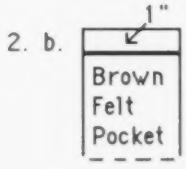


b. Pin BEAN PLANT pattern to folded felt and cut on solid lines.

2.a. Sew bean plant 4" from top of brown felt.



b. Fold brown felt up from bottom, leaving 1".



OUTCOME 18 (Continued)
PATTERNS AND DIRECTIONS (Continued)

3. Cut one tan bean seed using BEAN SEED pattern. Add features with marker.

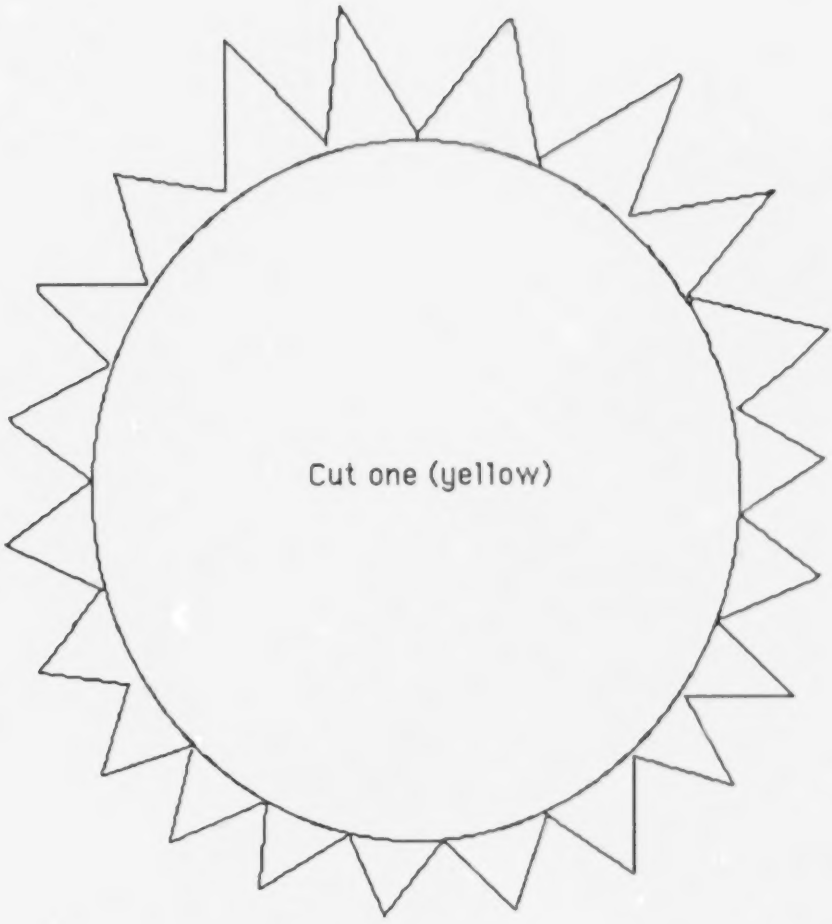
BEAN SEED
Pattern

4. Cut six raindrops using RAINDROP pattern.

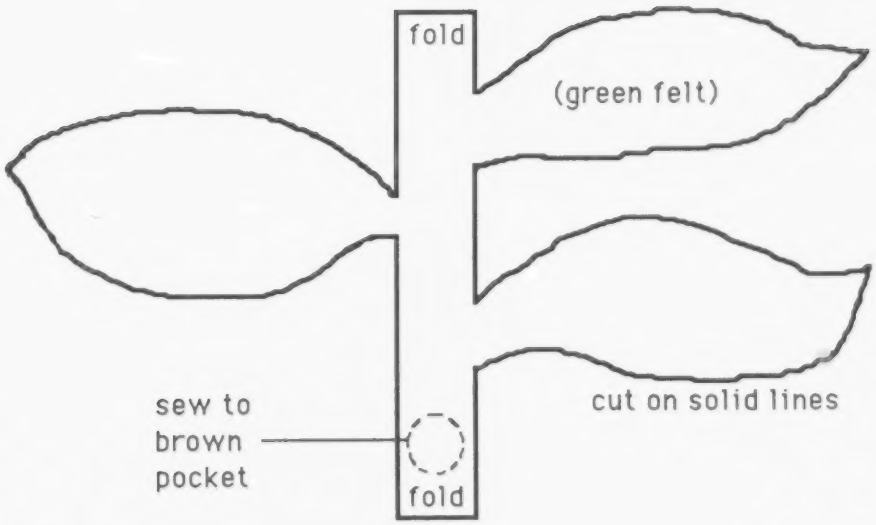
RAINDROP
Pattern

5. Cut sun from SUN pattern.

SUN
Pattern



BEAN PLANT
Pattern



KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Growth and Reproduction
OUTCOME: 18. Identify the need for soil, water, and light for the proper growth of plants.

Background

Plants need water, soil, and light to grow. Without one or all of these resources, the plant will not grow and it will die. This process can be illustrated by eliminating one or all of the needs when nurturing a plant.

In this activity, students will nurture and measure a bean plant. Each student will provide water, soil, and light for his or her plant. Another group of plants will be used as a control group. The control group will be used to show what happens when proper water, soil, or light is withheld from the plants. Students will keep weekly growth charts for their own plants and a class chart for the control plants. Data in the form of drawings and "string" measurements will be kept for a month. All data should be displayed on a bulletin board or wall area in the classroom.

Conduct the bean seed planting in a small group setting. Before beginning the activity, prepare the bulletin board or display area by cutting letters for the words "Plant Growth." Place the letters on the display area. Place scissors and yarn near the table or shelf where plants will be displayed. Cut tops off milk cartons and place a strip of masking tape on each one. Label three extra milk cartons: No Water, No Light, and No Soil.

Materials

- Large bowl
- Measuring cup, 1/4 cup
- Shelf or table near window or light source
- Potting soil, 2-pound bag
- Water
- White construction paper, 9" x 12" (4)
- Shoe box with top
- Yarn (any color except white)
- Bulletin board or wall area labeled: "Plant Growth"
- Scissors
- Milk cartons, 1/2 pint (3)
- Masking tape
- Permanent markers
- Large piece of chart paper or poster paper
- Glue or stapler
- Large bowl or box

OUTCOME 18 (Continued)
Materials (Continued)

For each student:

- Milk carton, 1/2 pint
- Lima bean seeds (2)
- Plastic spoon

Procedures

1. In a large group setting, discuss plant growth using questions such as:

   a. What do seeds need to grow? (Seeds need water, soil, and light.)
   b. Do some plants grow faster than others? (Yes)
   c. If everybody here grew a bean plant, would they all look exactly alike? (They would be very similar, but they would grow in different directions and at different rates.)
   d. How can we measure the plants? (Measure with a ruler or string.)

2. In a small group setting, give students empty milk cartons and have them write their names on the masking tape with permanent markers. Have students fill each milk carton one-half full with potting soil. Distribute two beans to each student. Instruct students to place the beans on top of the soil in the milk carton. Have students cover the beans with soil to almost fill the milk carton. Let students water their beans with one-fourth cup of water. Place the milk cartons on a shelf or table near a source of light.

   Continue working with small groups of students following the procedures above until all students in the class have planted beans.

3. In a large group setting, show students the three milk cartons labeled No Water, No Soil, and No Light. Ask questions, such as:

   a. What will happen if we plant seeds and then do not water them? (They will not grow.)
   b. What will happen if we plant seeds and then put them in a shoe box so that they are not exposed to light? (They will not grow.)
   c. What will happen if we put seeds in a milk carton with no soil? (They will not grow.)

OUTCOME 18 (Continued)
Procedures (Continued)

4. Follow the directions as outlined in Procedure 2 to plant seeds in the milk cartons labeled No Water and No Light. Place the milk carton labeled No Water on a table or shelf near a source of light. Do not add water at any time. Place the milk carton labeled No Light inside the shoe box after adding one-fourth cup water. Place two bean seeds in the bottom of the milk carton labeled No Soil, and add one-fourth cup water. Place this carton on a table or a shelf.

5. Let students water the plants twice weekly using one-fourth cup water each time. (Note: Two bean seeds are planted to allow for error. If both sprout, one must be discarded to allow for measurement activity.)

6. When the seeds start sprouting, use yarn to measure their growth twice weekly. Cut a piece of yarn as long as the plant is tall, and use glue or a stapler to attach it to a piece of white construction paper labeled with the student's name and the date. Record measurements for one month. Measure the three "control" plants. If control plants show any growth, place these measurements on a piece of white construction paper marked: No water, No light, and No soil. Keep all papers displayed on the bulletin board.

7. At the end of a month, use a piece of chart paper to record the data for: Longest Plant, Plant with Most Leaves, First Plant to Sprout, Plant with No Light, Plant with No Water, and Plant with No Soil. Fill in student's name or describe results, depending on what type of information is needed. Students may want to draw pictures on the chart to illustrate results. Place the chart on the bulletin board with other charts, and display them for another week.

8. Allow students to take plants home.

KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Growth and Reproduction
OUTCOME: 19. Name parts of a plant.

All flowering seed plants have flowers, leaves, roots, and stems. These parts work together to make plants grow and reproduce. The roots act to hold a plant firmly in the ground. Roots gather and/or store nutrients and water to feed the plant. The stems hold the leaves in place and act to bring water and nutrients to the leaves. The leaves make food for the plant and allow gases and water to escape into the air. The flower makes seeds so that new plants can grow.

Materials

- Plants, some with roots exposed
- Plant pictures with parts labeled
- Song: FANCY PLANT

Procedures

1. Display real plants and plant pictures.

2. Explain to the students that every flowering seed plant has roots, stems, leaves, and flowers.

3. Point to each plant part on a real plant or plant picture, and give a brief explanation of its function.

4. Ask students questions about the plants and pictures, such as:

   a. How are these plants alike? (Flowers, stems, leaves, roots)
   b. How are they different? (Color, shape, size)
   c. What parts are above the ground? (Flower, stem, leaves)
   d. What part is below the ground? (Roots)
   e. Do people have parts? (Yes, body parts: legs, arms, trunk, head)

5. Instruct students to pretend that they are plants. Ask the students: What body part could be the flower? (Head) Leaves? (Hands) Stem? (Trunk) Roots? (Feet)

   Teach students the song FANCY PLANTS and the accompanying motions.

OUTCOME 19 (Continued)
Procedures (Continued)

FANCY PLANTS
Song
(Tune: "Head, Shoulders, Knees, and Toes")

Flowers, leaves, stems, and roots,
stems and roots.
Flowers, leaves, stems, and roots,
stems and roots.
Help a plant to grow and reproduce.
Flowers, leaves, stems, and roots.

Motions: Touch head (flowers), extend arms and wiggle fingers (leaves), touch tummy (stem), and touch toes (roots) when singing words. Touch floor and pretend to grow when singing the line about growth and reproduction.

KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Growth and Reproduction
OUTCOME: 19. Name parts of a plant.

Background

All flowering seed plants have flowers, stems, leaves, and roots. In this activity, the planting of a root observation box will allow students to see all the parts of a plant growing and working together. A prerequisite to presenting this activity is to construct a root observation box using the following steps:

a. Cut off the top of the milk carton.

b. Using a sharp pencil, punch a hole near the bottom of the milk carton, and insert a two-inch piece of straw.

c. Cut a rectangle on one side of the milk carton, leaving a one-half-inch border. Place a piece of clear plastic in the space. Secure with water-resistant tape.

d. Cover the milk carton with adhesive-backed paper.

Prior to the activity, make the handout GROWTH OBSERVATION RECORD into a booklet for each student. Cut along the lines and staple the pages together, with or without a cover sheet.

Materials

- Milk carton, 1/2 gallon
- Sharp pencil
- Straw
- Clear plastic, 3 3/4" x 8 3/4" (sold by the yard in discount and fabric stores)
- Water-resistant tape, 1" wide
- Adhesive-backed paper
- Small rocks, charcoal, and sand
- Potting soil
- Large rubber bands (2)
- Parsley or radish seeds (Check dates on packages to make sure dates are current.)
- Water
- Construction paper, for booklet cover (optional)
- Scissors
- Stapler

OUTCOME 19 (Continued)
Materials (Continued)

For each student:

- Handout: GROWTH OBSERVATION RECORD

Procedures

1. Ask students to gather around a table to watch the planting procedure.

2. Put a one-inch layer of charcoal at the bottom of the root observation box. Next, add a one-inch layer of small rocks. Fill the rest of the root observation box with alternating layers of soil and sand, ending with a layer of soil.

3. Place rubber bands around the top and bottom of the root observation box to secure the clear plastic covering.

4. Scatter the parsley or radish seeds lightly over the top of the soil. Place a thin layer of potting soil over the seeds. Show the picture on the seed packet to the class. Have students discuss the size and shape of the seeds.

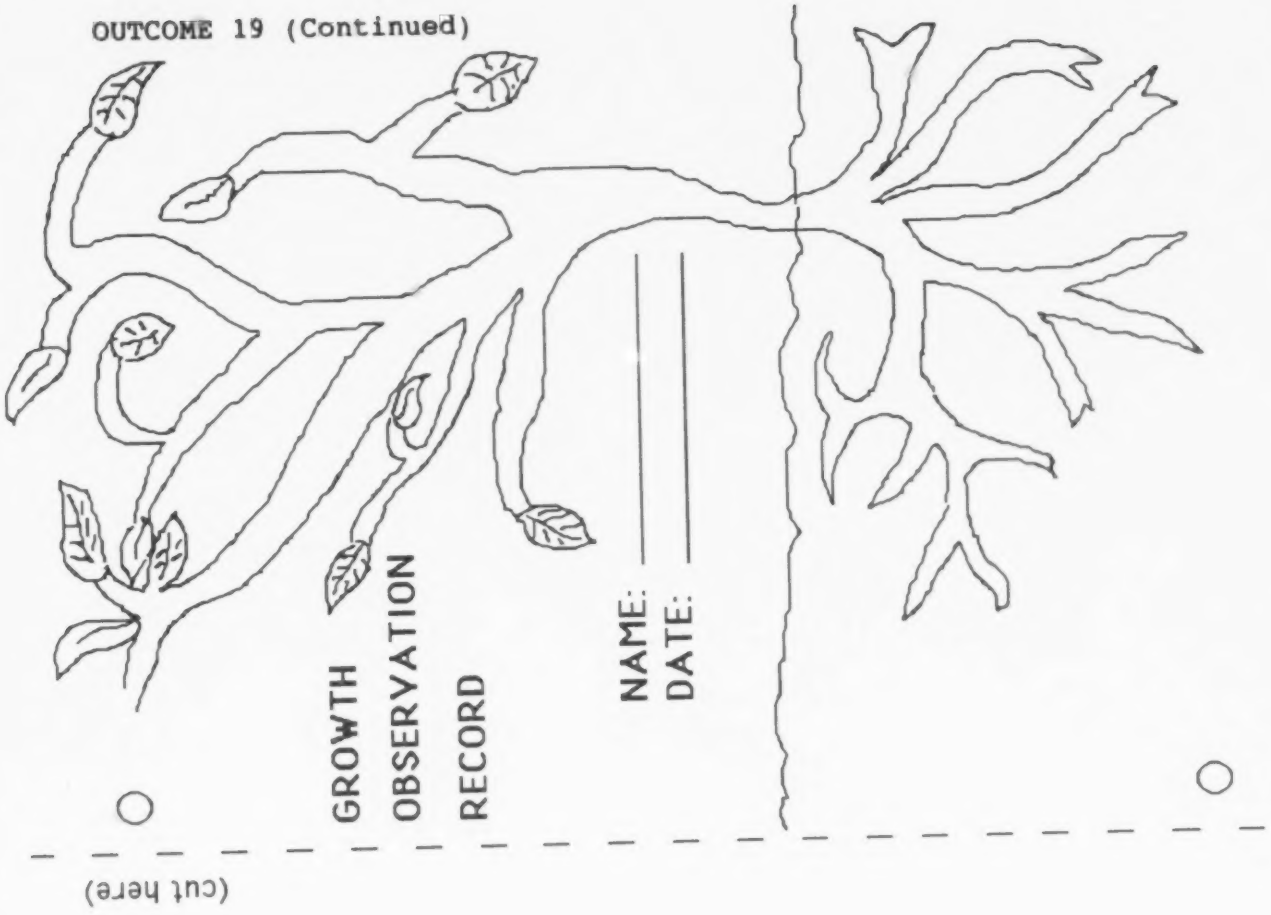
5. Slant the root observation box with the clear plastic covering in the down position. Explain that the roots will grow toward the clear plastic because roots tend to grow straight down.

6. Water the soil lightly. Have students watch carefully to observe how water drains through soil.

7. Give each student a copy of the handout GROWTH OBSERVATION RECORD. Direct students to draw the soil layers they see in the root observation box. Have students check the growth of the seeds at the end of each week. Demonstrate or discuss how the students might draw pictures to illustrate their observations. Continue this procedure until the handouts are completed.

8. Keep the handouts GROWTH OBSERVATION RECORDS in a special place where the students can have access to record growth changes as they occur.

OUTCOME 19 (Continued)



OUTCOME 19 (Continued)

Week 1 Date: _____

Week 2 Date: _____

(cut here)

78

OUTCOME 19 (Continued)

Week 4 Date: _____

(cut here)

Week 3 Date: _____

KINDERGARTEN
LIFE SCIENCE

UNIT: Plants
TOPIC: Growth and Reproduction
OUTCOME: 20. Discover that seeds of plants will produce like plants.

Background

All seeds have the elements needed to grow a new plant. Contained in every seed is an embryo, which is a tiny new plant, and cotyledons, which contain food to nourish the embryo until it is able to produce its own food. Seeds will remain dormant until conditions (moisture and warmth) are favorable for growth.

Some deciduous fruits and nuts need a period of moist winter chilling before sprouting (three weeks to three months, depending on the seed). Citrus seeds will grow without this period of moist winter chilling and will make good examples to show the students how each plant can make its own new plant.

Before beginning this activity, mix enough sand and potting soil (one to one) to fill one, one-half pint milk carton for each student. Prepare each carton by removing the top, placing a piece of masking tape on each, and writing a name on the masking tape.

Completion of this activity will take about a month. Use a day or two while the seeds are drying to study the life cycle of a lemon plant. At this time, have students complete the handout LEMON LIFE CYCLE. Use the handout as a guide to discussion.

Materials

For each student:

- Citrus seeds: orange, grapefruit, tangerine, lemon, or lime
- Empty milk carton, 1/2 pint
- Potting soil
- Small stones or pebbles
- Water
- Sand
- Gardening spade or large spoon
- Pencil
- Masking tape
- Cardboard box bottoms (drainage trays)
- Handout: LEMON LIFE CYCLE

OUTCOME 20 (Continued)

Procedures

1. Have students save seeds from citrus fruits. (The school lunchroom is a possible source.) If more than one kind is being used, be sure to label the seeds.

2. Observe and discuss the seeds, asking questions such as:

   a. From what source did the seeds come? (Fruit should be named.)
   b. Can you tell from which fruit they came? (Try smelling them.)
   c. Do they all look the same? (Sizes may vary.)
   d. Do you think they will grow? (Accept and discuss answers.)
   e. What kind of plant do you think it will be? (The students might say "orange plant" if it came out of an orange.)

   Emphasize the fact that citrus fruits grow on trees and that the seeds will grow into trees that can produce the fruits.

3. Dry the seeds two or three days.

4. Tell students that inside each seed is a tiny embryo that will grow into a plant, that the embryo will not grow until conditions are right, and that the embryo needs to be moist and warm to grow. Point out that when the baby plant grows, it will be the same type of plant as the plant from which it came.

5. Give each student a copy of the handout LEMON LIFE CYCLE. Direct each student to color the picture, cut the two parts on the dotted lines, and slide the picture through the slits on the lemon. Demonstrate how to slide the picture through to show the correct sequence. Have students discuss what is happening in each picture as they pull the pictures through the opening.

6. Give each student a prepared milk carton and a pencil. Instruct students to punch two or three small holes in the bottom of the cartons with their pencils. Explain that this allows the extra water to drain.

7. Provide small stones for students to place in the bottom of their cartons. Give students a predetermined number of spoonfuls or spadefuls of soil to place in their cartons.

8. Give each student at least three seeds to scatter in his or her carton. Have students scoop a small amount of soil over their seeds to cover them.

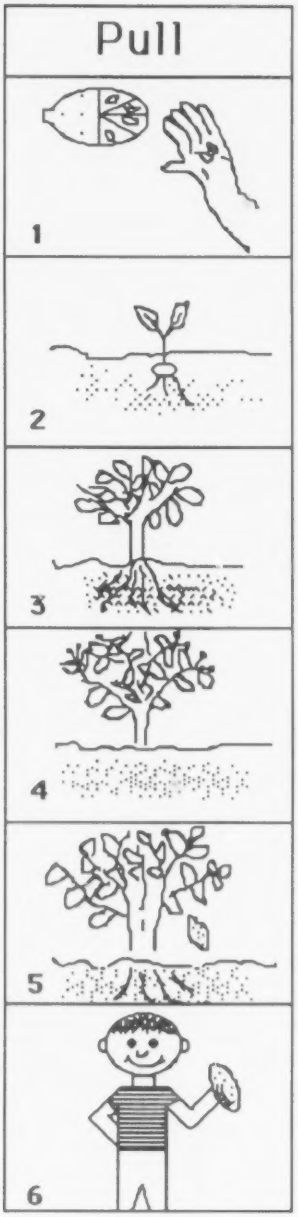
9. Let each student pour one or two scoops of water (depending on the size of scoop) over the planted seeds.

OUTCOME 20 (Continued)
Procedures (Continued)

10. Place the cartons on a tray in a well-lighted area of the classroom.

11. Water, watch, and wait for the seeds to sprout. Let the students take their seedlings home after sprouting.

LEMON LIFE CYCLE
Handout



Seeds from a lemon

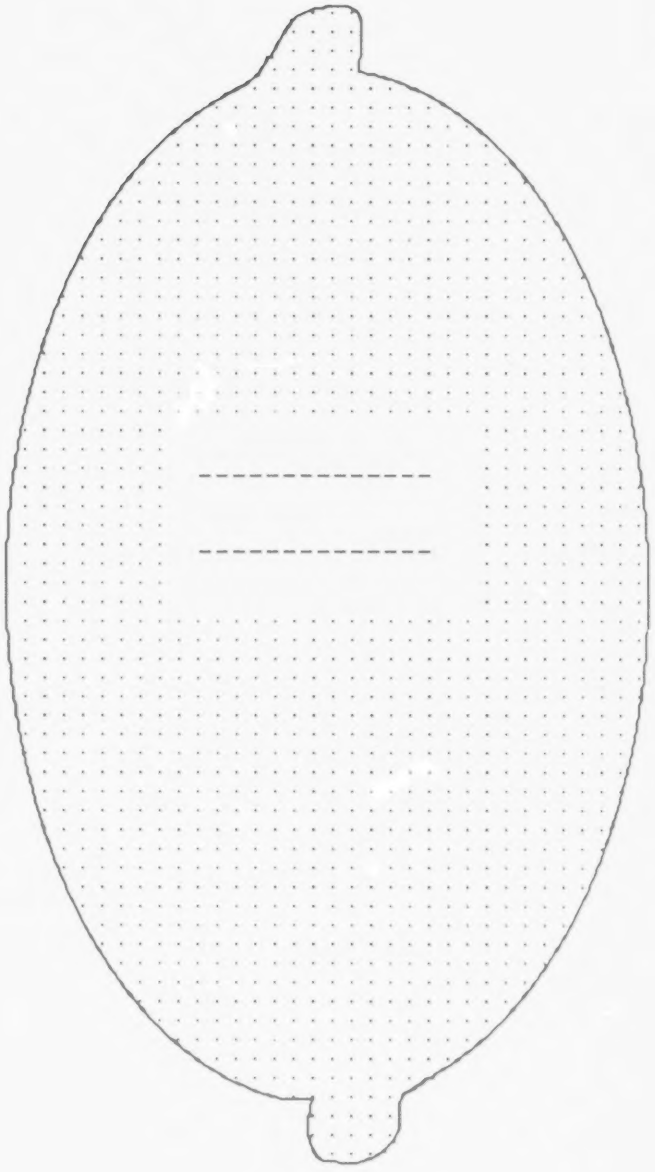
Seedling begins to grow

And grow into a tree

Flowers bloom on tree when they fall off

Lemons grow from "cone" of flowers

Pick lemons and enjoy.



KINDERGARTEN
LIFE SCIENCE

UNITS: Plants
TOPICS: Helpful and Harmful Plants
OUTCOME: 21. Explain ways plants are useful to people (food, clothing, shelter).

Background

Students may only be aware of plants by noticing potted plants or observing outside plant growth. This activity should increase a student's awareness of the food, clothing, and shelter provided by plants. Before beginning the activity, gather all materials and read through the specially adapted version of the story THE THREE LITTLE PIGS. Provide each student with a copy of the handout HELPFUL PLANTS.

Cotton is a plant used to make yarn and fabric for clothing. Try to provide a cotton plant with an open boll for observation by the students. When a cotton boll bursts, the cotton tuft is visible. To be stored in bales, the bolls must be collected and the cotton seeds removed from the cotton. When cotton is ready for processing, the contents of each bale are beaten to separate the fibers. The fibers are formed into a sheet on a special machine. Fibers are then carded on a machine to detangle, straighten, and clean. Because only long fibers make good cotton, shorter fibers are removed. The long slivers of fiber are pulled through rollers to make finer strands. The strands are then twisted and pulled to make yarn for weaving or knitting.

Materials

- Story: THE THREE LITTLE PIGS
- Handout: HELPFUL PLANTS
- Old magazines
- Glue
- Scissors

Procedures

1. Read the story of THE THREE LITTLE PIGS to the students.

2. In a large group setting, lead a discussion about helpful plants the pigs used in the story, asking questions such as:

    a. Did you notice that the pigs used plants in many different ways in the story? (Yes)

    b. How did the pigs use plants as food? (They ate the apples from the tree.)

OUTCOME 21 (Continued)
Procedures (Continued)

c. How did the pigs use plants to make their homes? (They used straw, sticks, and lumber.)

d. How did the pigs use plants as clothing? (Their mother made them all cotton sweaters. Further explanation may be needed about how to make sweaters from cotton.)

e. Can you name some other helpful ways plants can be used? (Answers will vary.)

3. Explain to the students that plants are very helpful in many ways. Review the list of ways the students were able to enumerate. Name some additional ways to extend the list.

4. Show the students the magazines. Present pictures of several things that show helpful ways plants are being used. Allow discussion.

5. In small groups, give out magazines and allow students to look through them.

6. Give students the handout HELPFUL PLANTS and have them find pictures of at least one thing that comes from a plant to place in each of the categories: shelter, clothing, and food. Provide assistance as needed.

THE THREE LITTLE PIGS
Story

Once upon a time there were three little pigs. They were happy little pigs. They lived in a lovely little house with their mother and grew to be big and fat.

One of their favorite things to do was to shake the big apple tree and eat until they were full. They all said that when they were grown, they would build a house of their own and plant an apple tree in the yard.

Well, the day came when their mother decided they were all ready to go out into the world on their own. She went into the cotton field by their house and gathered lots of cotton bolls from the cotton plants there. She removed the seeds, combed the cotton, and spun it into yarn. With this yarn, she made each little pig a nice, warm sweater to wear on his journey out into the world. The three little pigs were very proud and set out to prove themselves.

The first little pig met a man pulling a cart of straw. He thought this would make a nice house, so he bought it. He was also very lazy and knew that he could quickly build a house from straw. This he proceeded to do. He finished in a hurry and planted a little apple seed to make a tree in his yard.

The second little pig met a man with a load of sticks. He was not quite so lazy as the first little pig, but he thought that the sticks would make a strong house without much work. He built his house of sticks and planted a little apple seed in the yard.

The third little pig was not lazy at all. In fact, he was quite industrious. He studied all kinds of houses and decided what he needed was a house of bricks and wood. He got several loads of heavy brick. He cut down trees and sawed the wood into boards and proceeded to build his house. It took quite a while, but his house was warm and strong when he finished. Instead of planting an apple seed, he had looked for a grown apple tree and had built his house near this tree. So he had plenty of apples as soon as he moved into his house.

Well, it just happened that a mean wolf came by one day and spotted the houses of the little pigs. He liked nothing better than a meal of nice, tender pigs.

OUTCOME 21 (Continued)
Procedures (Continued)

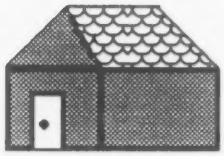
The wolf went to the house of the first little pig. He knocked, knocked, and knocked at the door and said, "Little pig, little pig, let me come in." The little pig was frightened and said, "No, not by the hair of my chinny, chin, chin." "Very well, then," said the wolf. "I'll huff and puff and blow your house in." And he huffed and he puffed and he blew the house down. The first little pig ran quickly to the house of the second little pig.

The wolf was angry. He ran to the house of the second little pig and knocked, knocked, and knocked at the door and said, "Little pig, little pig, let me come in." "No, not by the hair of my chinny, chin, chin," said the second little pig. So the wolf huffed and puffed and huffed and puffed and blew the house made of sticks down. The two little pigs ran as fast as they could to the brick and wood house of the third little pig.

The wolf was really angry now. He growled and knocked, knocked, and knocked on the door. He said, "Little pig, little pig, let me come in." The third little pig said, "No, not by the hair of my chinny, chin, chin." The wolf said, "Then I'll huff and I'll puff and I'll blow your house down." The third little pig cried, "Try if you will, but I'll not let you in." The wolf then began to huff and puff. He huffed and he puffed and he huffed and he puffed, but he could not blow the house down. Boy, was he mad. Then, he noticed the chimney. He climbed to the top of the house and hopped down the chimney.

It just so happened that the third little pig was making a big pot of stew. When he heard the wolf coming down the chimney, he took off the top, and the wolf fell right in the stew. And that was the end of the big bad wolf. The three little pigs all moved into the brick house. They ate apples and wore their sweaters and lived happily ever after.

HELPFUL PLANTS
Handout

Food	Clothing	Shelter 

KINDERGARTEN
LIFE SCIENCE

UNITS: Plants
TOPICS: Helpful and Harmful Plants
OUTCOME: 22. Identify plants that are harmful to people.

Background

Some plants are harmful to people. Poison ivy is the name of a harmful plant that can be extremely irritating to the skin. The tissues of the plant contain an oil that causes a very itchy rash on the skin. Anyone who goes into the woods should be able to recognize poison ivy in order to stay away from it. The leaves are green in summer and orange in fall. Each leaf has three leaflets that are notched on the edges. Poison ivy has small green flowers that grow near the center. Later in the season, clusters of small berries also grow near the center. These berries are poisonous. Anyone who comes in contact with poison ivy should wash the skin carefully with soap and water and be careful not to touch the face or another part of the body until he or she is completely clean.

Some plants are poisonous when ingested. Some mushrooms are good to eat, while others are poisonous. There is no way to tell a good mushroom from a poisonous one unless one is an expert. A wild mushroom should never be eaten. Other poisonous plants are mistletoe berries, poinsettias, mountain laurel rhubarb leaves, and leaves and twigs from a black cherry tree. It is important to stress to students never to eat a plant without consulting an adult.

Some plants can give people hay fever. Hay fever causes itchy, red eyes and sneezing. One plant that causes hay fever is ragweed. The pollen from this plant floats in the air. Hay fever is caused when the pollen is breathed into the nasal passages and lungs. Some people are very sensitive to this.

Materials

- Pictures of harmful plants (Consult encyclopedias, the local health department, and the extension service.)

For each student:

- Picture cards of harmful plants (samples included)

OUTCOME 22 (Continued)

Procedures

1. Have a discussion about harmful plants. Ask questions such as the following:

   a. Have you ever had a rash?
   b. Have you ever had a stomach ache?
   c. Have you ever had hay fever?

   Allow a few students to describe each of these.

2. Explain to students that some plants are harmful and can cause rashes, stomach aches, hay fever, or even death.

3. Show pictures of several harmful plants. Talk about symptoms each one can cause.

4. Show large picture cards of poison ivy, mushrooms, and ragweed. Explain the harmful effects of each.

5. Teach students to play the following game:

   "The Rash Game"

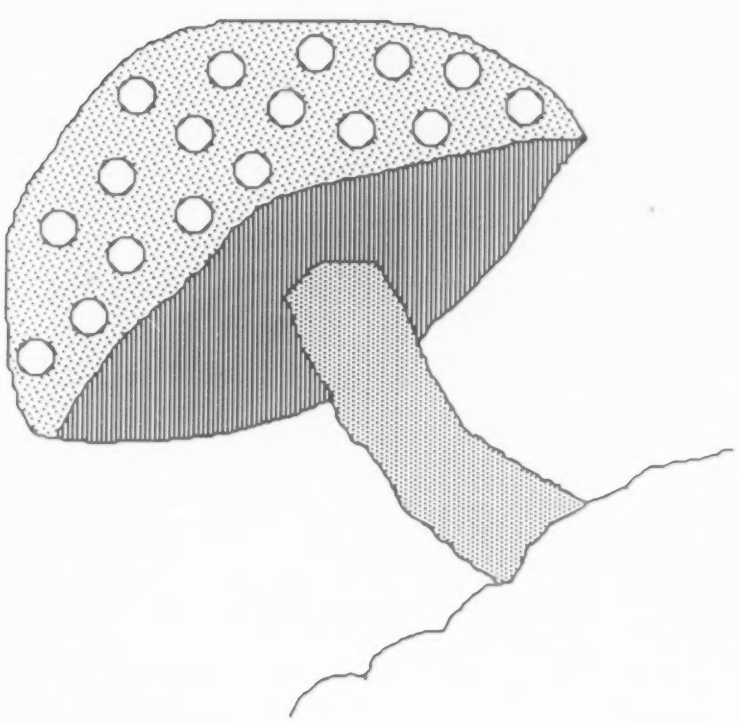
   a. Arrange picture cards in a circle on the floor (one for each student).

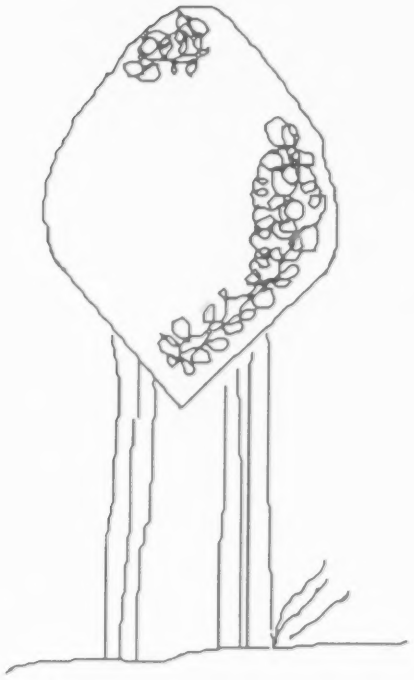
   b. Students walk around a circle outside the picture cards to music.

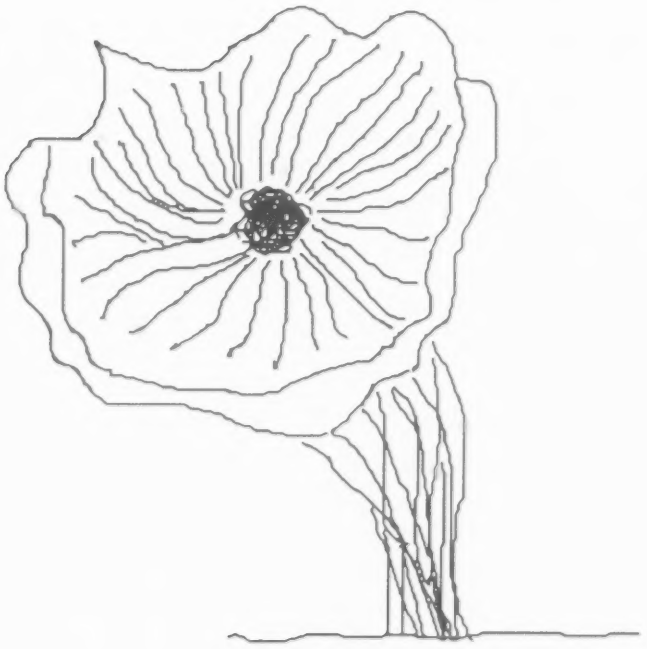
   c. When the music stops, select a student to describe the harmful effects of the plant on the picture card.

   d. Play several times until most students have had a chance to describe each kind of plant.

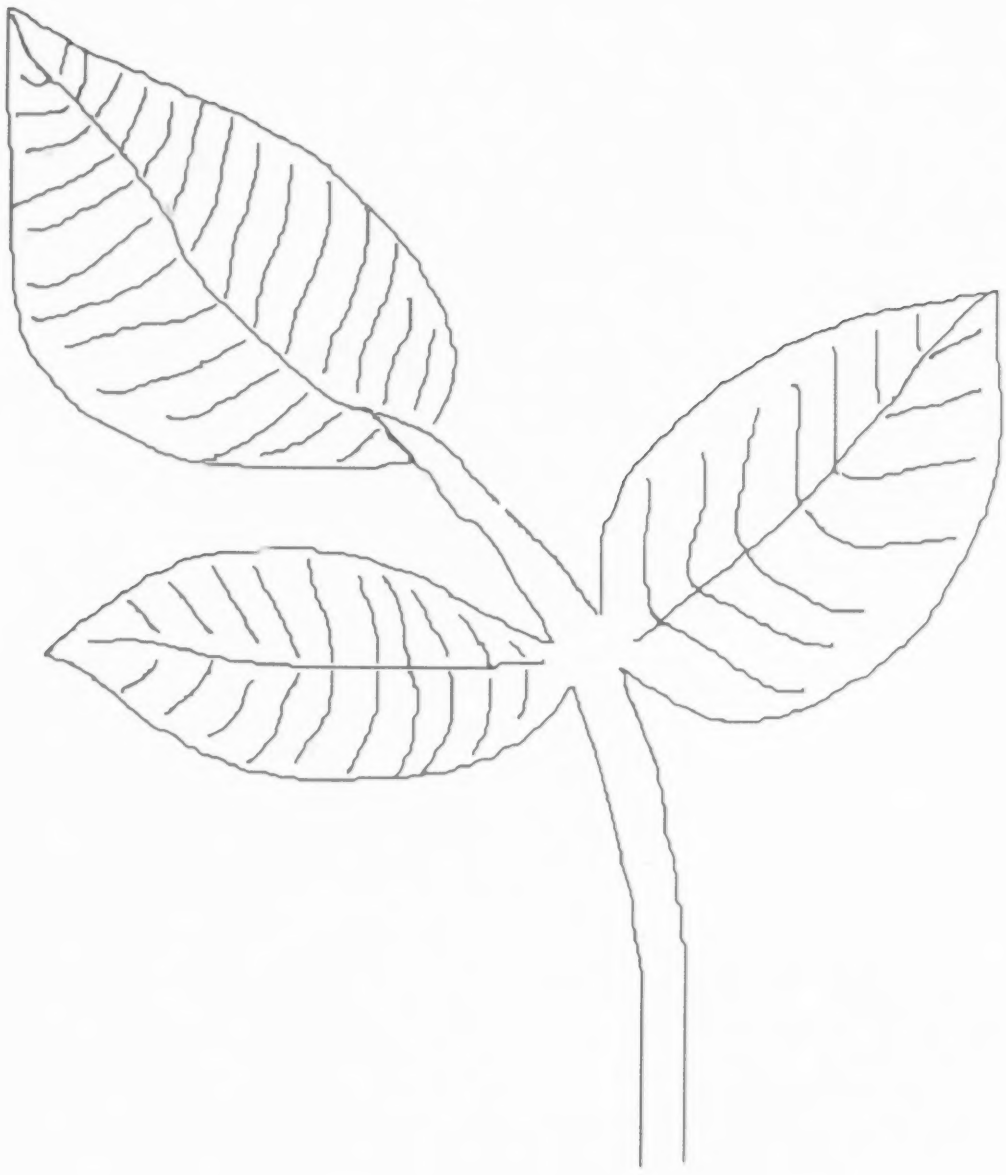
MUSHROOMS



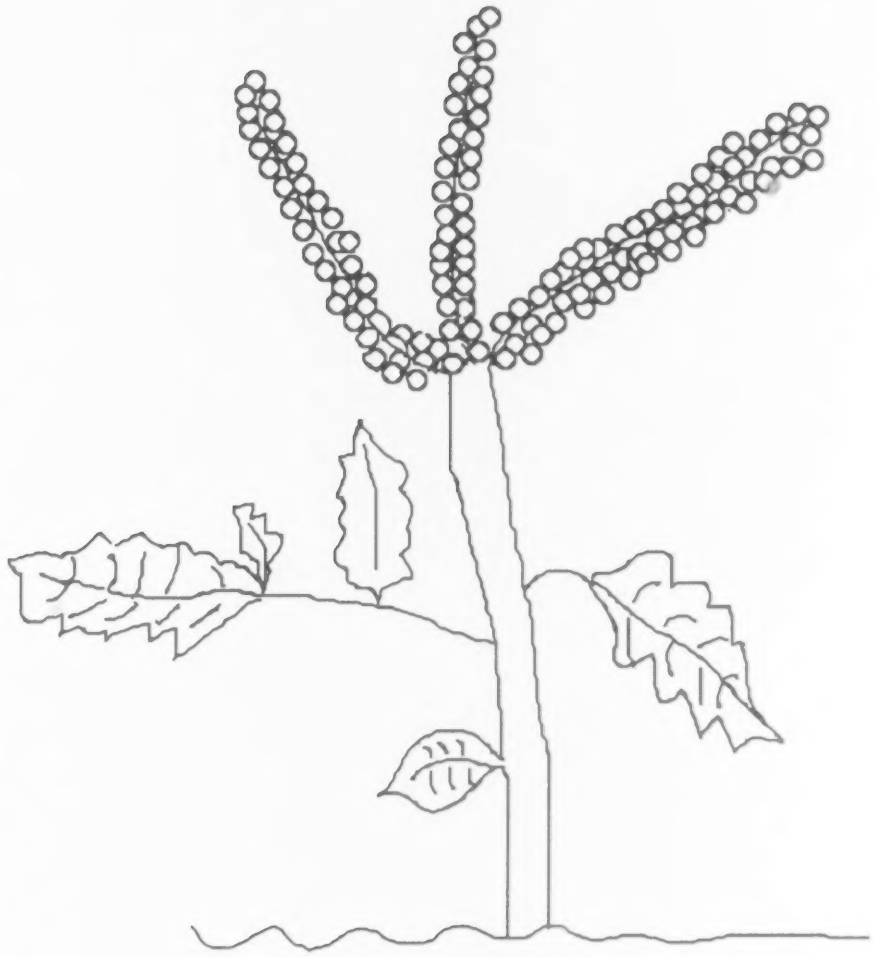




POISON IVY



RAGWEED



KINDERGARTEN
EARTH SCIENCE

UNIT: Air
TOPIC: Location of Air
OUTCOME: 23. Observe and demonstrate that air is all around.

Background

This activity reinforces the concept that air is everywhere and introduces new words to give students a working vocabulary to describe their discoveries about air. The activity progresses from a whole group setting to individual discovery work. Encourage students to illustrate their discoveries with drawings and/or language experience charts.

Before starting the activity, arrange a Discovery Station in the classroom near a source of water. Place containers with balloons, straws, and clear, plastic cups within easy reach of students. Partially fill a large, plastic container with water. Place a trash receptacle nearby.

Materials

- Clear, plastic detergent bottle
- Large, clear, plastic containers (3)
- Crayons or markers
- Self-sealing plastic bags, sandwich-size, (3)
- Directions: DISCOVERY STATION
- Trash receptacle

For each student:

- Straw
- Clear plastic cup
- Water
- Balloon

Procedures

1. In a large group setting, show students the empty, clear, plastic detergent bottle. Ask if there is anything in the bottle. (No) Walk around to each student and squeeze the bottle quickly so that each student can feel a puff of air on his or her skin. When they react, remind the students that they said nothing was in the bottle. Discuss the situation using the following questions:

   a. Did you see anything in the bottle? (No.)
   b. Was there something in the bottle? (Yes.)
   c. How do you know? (I felt it.)
   d. What was in the bottle? (It might have been wind, air, or breath.)
   e. How did it get into the bottle? (It got in through the hole in the top.)

Procedures (Continued)

f. From where did it come? (It came from outside the bottle.)
g. Do you think there is air outside the bottle? (Yes.)
h. Can you see it? (No.)
i. How did the air get out of the bottle? (It was squeezed or pushed out.)

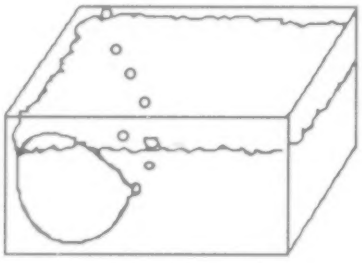
2. Tell students that air is everywhere. Explain to students that air cannot be seen, but air can be felt when it moves.

3. Show students the work area where the Discovery Station has been arranged. Demonstrate the following activities for students:

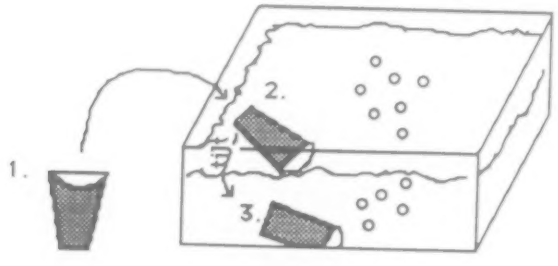
a. Inflate the balloon. Place the balloon under water in a large, plastic container and watch air bubbles escape. Ask questions such as: What made the balloon get bigger? (Air made it get bigger.) What was the source of the air? (The teacher's body was the source of the air.) What happened when the air was released under water? (The balloon got smaller; bubbles came out.)

1.

2.

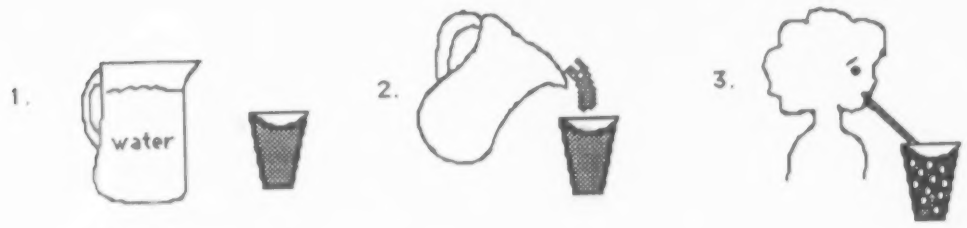


b. Invert the clear, plastic cup in water in the large, plastic container. Tilt the cup slowly and watch air bubbles escape. Discuss student observations using questions similar to the questions in Procedure 3.a.



OUTCOME 23 (Continued)
Procedures (Continued)

c. Partially fill the clear, plastic cup using water from the pitcher. Place the straw in the cup of water. Place mouth on the straw and blow. Watch air bubbles move under water. Discuss. Provide a cup and straw for each student.



4. Tell students that the activities will be made available for a few days. Show students the location of the materials in the Discovery Station. Place the DISCOVERY STATION directions in the Discovery Station to remind students of the proper use of the centers. Limit use of activities to one student per center.

DISCOVERY STATION
Directions

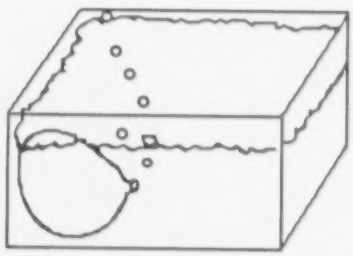
1.
Pour Water

2.
Blow into straw

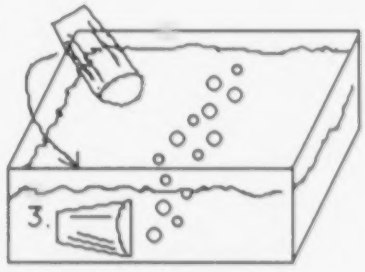
Instructions for teacher:

1. Color
2. Cut out on black line
3. Place in self-sealing plastic bag
4. Tape to table near each discovery station

1.

2. 

1.

2. 

KINDERGARTEN
EARTH SCIENCE

UNIT: Air
TOPIC: Uses of Air
OUTCOME: 24. Demonstrate uses of air.

Background

Air is used every day in the classroom in a variety of ways. This activity instructs students to list ways air is used in the classroom. After making lists, students will participate in an activity using air to make bubbles.

Air, water, and soap are ingredients needed to make bubbles. This activity requires advance preparation as follows:

a. Collect materials in advance. Hula hoops can be brought by students or borrowed from a physical education teacher.

b. Construct bubble-making instruments. Cut off tops and bottoms of milk cartons. Form coat hangers into different shapes; bend the hook and tape it to make a handle.

c. Place a wading pool outside near a source of water.

d. Place dish detergent bottles, a measuring cup, and a gallon milk container near a water source and a wading pool.

e. To make the bubble solution, use one gallon of water and one cup of dish detergent. Multiply the bubble-solution recipe as many times as needed to fill the wading pool three or four inches deep.

Materials

- Hula hoop
- Small wading pool big enough for hula hoop
- Water
- Liquid dish detergent (several bottles)
- Coat hangers (5)
- Measuring cup
- Milk jug, 1 gallon
- Milk cartons, several sizes
- Chart paper (optional)
- Markers
- Chalkboard

OUTCOME 24 (Continued)

Procedures

1. In a large group setting, lead a discussion about air asking questions such as:

   a. Can you see the air around you? (No.)
   b. Can you see the things that air can do? (Yes.)
   c. How is air used in the classroom? (Answers will vary.)

2. Enumerate a list of items students name concerning how air is used in the classroom. After compiling the list, demonstrate as many items on the list as possible. For example, demonstrate how a fan moves air.

3. In a large group setting, lead a discussion about bubbles asking questions such as:

   a. What shape are bubbles? (Bubbles are round or circular in shape.) Introduce the word sphere.
   b. What is inside a bubble? (Air is inside a bubble.)
   c. What do we need to make bubbles? (We need soap, water, and air.)
   d. What size are bubbles? (Bubbles are many sizes.)
   e. Do you think we could make a giant bubble? (Answers will vary.)
   f. How? (Use a large, round, bubble-making instrument.)
   g. Do you think we could make a tiny bubble? (Answers will vary.)
   h. How? (Use a small, round bubble-making instrument.)
   i. What if we dipped a square into the bubble solution? (Answers will vary. Allow the answer to this question to remain a mystery if the students are not sure.)

   Record questions and answers on the chalkboard.

2. Show students the wading pool and the hula hoop. Tell the students that the wading pool is where they will make the giant bubble. Show students the other bubble-making instruments.

3. Take students outside to mix the bubble solution. Allow, as much as possible, for the students to help with the measuring of water and dish detergent. Provide one cup of dish detergent for each gallon of water. Use the gallon milk container for measuring the water.

4. After placing the water and dish detergent into the wading pool to make a depth of three to four inches, allow students to use their hands to thoroughly mix the water and dish detergent.

OUTCOME 24 (Continued)
Procedures (Continued)

5. Dip the hula hoop slowly into the water and then lift it. Move the hula hoop slowly through the air to make giant bubbles. Demonstrate the use of the prepared clothes hangers and milk cartons.

6. Allow students time to experiment with the bubble-making activity. Instruct students to share the different types of bubble makers. Make sure each student tries each bubble maker.

7. When the excitement of bubble making is over, bring students to the classroom. Look at the chart containing questions and answers. Present each question and answer. Make necessary changes. Discuss the findings by asking questions such as:

   a. What is the shape of a bubble? (They are always somewhat round.)
   b. What determines the size of a bubble? (The amount of air blown into the instrument and the size of the instrument determines the size of a bubble.)
   c. What color is a bubble? (Many colors can be seen on the bubble.)
   d. What three things do we need to make bubbles? (We need air, water, and soap.)

Extension

Make "bubble" prints with tempera paint using round shapes for dipping.

KINDERGARTEN
EARTH SCIENCE

UNIT: Air
TOPIC: Wind
OUTCOME: 25. Demonstrate how wind affects objects.

Background

Wind is air that is moving. Wind is caused by the unequal heating of the earth's surface by the sun. Heated air next to the earth's surface expands and becomes lighter. Lighter, warm air is pushed up by the heavier, cold air surrounding it. Colder air is heated by the earth and pushed up again. This process sets up a current called a CONVECTION CURRENT. This process is further influenced by the rotation of the earth on its axis. Thus, there is a constant movement of air over the entire earth in the form of WIND BELTS.

This activity allows students to begin to experiment with moving air supplied by an ordinary classroom fan. Students should be cautioned about the dangers involved in using a fan. Demonstrate the effect the moving air in front of the fan has on several objects. The students should begin to understand that wind affects each object differently according to its shape, size, and/or weight.

Materials

- Wind chime
- Bubble-blowing mixture
- Fan
- Plastic garbage bags (5)
- Song: THE AIR

For each student:

- Crepe-paper streamer
- Tissue

Procedures

1. Explain to students that wind is air that moves. Discuss the cause of wind using the following questions:

    a. When you observe smoke, which way does it move? (Up)
    b. What causes the smoke? (Fire or heat)
    c. Is fire hot or cold? (Hot)
    d. If hot air rises, which way do you think cold air goes? (Down)

Procedures (Continued)

Explain to students that air causes wind on the earth. Tell students the sun heats the earth. State that the air immediately above the earth rises like smoke; then, cold air pushes down under hot air and becomes warmed by the earth. Use arm movements to show how the movement of air makes a cycle.

2. Teach students the following song and motions:

THE AIR
Song
(Tune: The Wheels on the Bus)

The air near the earth gets so, so warm so, so, warm, so, so, warm. The air near the earth gets, so, so, warm, Each and every day.	(Students stand, then crouch and fan faces as if hot.)
The nice warm air floats up, up, up, up, up, up, up, up, up. The nice warm air floats up, up, up, Just like smoke from a fire.	(Students slowly stand, raising arms.)
The cool, cool, air comes down, down, down, down, down, down, down, down, down. The cool, cool, air comes down, down, down, And stays down near the ground.	(Students hug their own bodies as if freezing, then slowly crouch to make balls.)
The hot and cold air goes up and down, round and round, hot and cold. The hot and cold air make wind, you see. For you and me to play.	(Students move bodies up and down and swing arms around.)

3. After singing the song a few times, turn on the fan that has been placed near the students. Explain to students that although the wind caused by the fan is not the same as wind made naturally by the movement of hot and cold air, they can use this man-made wind to observe what effects moving air has on objects.

OUTCOME 25 (Continued)
Procedures (Continued)

4. Give each student a crepe-paper streamer. Have each student walk in front of the fan. Have students describe what happens when wind and crepe paper are combined.

5. Ask students to predict what will happen if bubbles are blown in front of the fan. Blow a few bubbles in front of the fan. Have students describe what happens. Blow a few bubbles away from the fan. Discuss the differences.

6. Open one of the plastic garbage bags. **CAUTION** students about dangers of putting bags over their heads. Ask students to predict what will happen if they hold the open end of the bag in front of the fan. Have students take turns letting the bags fill with air. Discuss and describe what happens.

7. Follow Procedure 6 again and let the students experiment with wind chimes.

8. Show students the tissues, bubbles, streamers, wind chimes, and garbage bags. Store each item in a separate box. Let students experiment with the items individually at another time with adult supervision.

Extension

Have students draw pictures of activities they like to participate in on a windy day. Dilute blue tempera paint and drop a small amount onto each picture. Have students blow through a straw and push paint in one direction across the page to represent wind.

KINDERGARTEN
EARTH SCIENCE

UNIT: Solar Energy
TOPIC: Light and Heat from the Sun
OUTCOME: 26. Demonstrate effects of light and heat from the sun.

Background

The sun is the earth's major source of heat and light. Energy from the sun gives us warmth and light. Energy that comes from the sun is called solar energy.

This activity works best on a hot, sunny day.

Materials

- Cookie sheet
- Crayon, unwrapped
- Wet washcloth
- Metal spoon
- Glass of ice

Procedures

1. Discuss with students that the sun is the major source of the earth's heat and light. Discuss the difference between day and night. Explain that the moon only reflects light from the sun and that it has no light of its own.

2. Ask students how the sun makes them feel after playing outside on a hot, sunny day. List responses on the chalkboard.

3. Have students locate a sunny spot outside the classroom. Place an unwrapped crayon, a metal spoon, a wet washcloth, and a glass of ice on a cookie sheet.

4. Allow the students to observe the objects on the the cookie sheet after an hour. Discuss with students the changes in the objects. Ask students what caused these changes (heat from the sun). Point out that the crayon and ice will melt, the spoon will be warm, and the washcloth will be drier.

Extension

Allow students to observe the sun-faded background paper of the bulletin board after the materials have been removed.

KINDERGARTEN
EARTH SCIENCE

UNIT: Solar Energy
TOPIC: Uses of Solar Energy
OUTCOME: 27. Explain how solar energy can be used in homes.

Background

Solar energy can be used to provide heat for a house. A large collector panel can be constructed on the roof or sloping side of a house that faces the sun to collect the sun's heat energy. This energy heats water that is pumped through the house. The heat can be stored in the water so the house is warmed day and night.

A field trip to a solar-heated home would provide an opportunity to observe solar energy being used.

Materials

- Picture or diagram of a solar-heated home
- Jar of water

Procedures

1. Allow students to stand near a sunny window and feel the heat from the sunlight. Explain to the students that the sun gives heat energy and that homes can be heated and cooled with solar energy.

2. Show students a picture or diagram of a solar heated home. Show students how a large area of a roof on a sloping side that faces the sun can be constructed to serve as a heat collector. Tell students that the sun heats water that is pumped through the house; then the heated water warms the house.

3. Allow students to fill a jar with cold water and place it in a sunny window. After an hour, allow students to touch the water and observe the difference in the temperature of the water. (The heat energy from the sun warms the water.)

Extension

Provide students with a solar calculator to use in a light and dark area. Have students locate the solar panel on the calculator.

KINDERGARTEN
EARTH SCIENCE

UNIT: Weather and Seasonal Changes
TOPIC: Daily Weather Changes
OUTCOME: 28. Describe daily weather conditions.

Background

Official weather reports usually classify the weather in terms of cloudy, partly cloudy, sunny, and a chance of rain described as percentage occurrences. Young students may find it easier to relate to what they can see, feel, and hear. This activity is two-pronged:

a. To aid students in making observations
b. To assist students in describing the weather conditions and interpreting those conditions for daily use

Weather conditions recognizable to students are sunny, cloudy, windy, rainy, hot, cold, and partly cloudy.

Materials

- Shallow, clear plastic cup with hole in top side for nail
- Pinwheel
- Old suitcase
- Child's clothing (1 each)
  - raincoat
  - rubber shoe covers
  - umbrella, can be opened or furled
  - jacket, warm
  - sweater
  - mittens and toboggan
  - swim suit
  - hat with snap or tie under neck
- Roofing nail

Procedures

1. Collect the clothing as listed above from available sources, such as a yard sale, Goodwill, Salvation Army, previous years' lost and found boxes, or a thrift shop.

2. With a roofing nail, attach a clear plastic cup to a tree or a fence post somewhere on the playground. Place the cup low enough for a student to see and feel moisture or rain in the cup. (An alternate location would be outside the classroom on a window ledge.)

OUTCOME 28 (Continued)
Procedures (Continued)

3. Introduce the items of clothing to the class by asking what weather conditions would make it necessary to use each of the clothing items.

   Then ask students the following questions:

   a. What do you wear when the sun is shining brightly and it is hot?
   b. If the wind is blowing hard, what do you have to do differently than when the wind is blowing gently?
   c. What is the weather like when you wear a heavy coat, hat, and mittens?

4. Assign a student the responsibility for reporting the daily weather conditions. Have the student take the pinwheel outside to check for wind and check the plastic cup for rain. Provide adequate supervision.

5. Have the student return to the class and select from the suitcase the items needed for outside wear.

6. Tell the student to dress in that clothing or display that clothing for the group.

7. Have the group describe the daily weather conditions from their classmate's observations and interpretation.

Extension

Use doll clothes and dress a doll instead of dressing a student.

KINDERGARTEN
EARTH SCIENCE

UNIT: Weather and Seasonal Changes
TOPIC: Daily Weather Changes
OUTCOME: 29. Illustrate different weather conditions through pictures.

Background

This activity is designed to give students experience in observing and verbally communicating daily weather conditions. A prerequisite to this activity is for students to have book-making experience.

The length of time for this activity is one week or longer.

Materials

For each student:

- Construction paper (2 sheets)
- White drawing paper (5 sheets - more if the student desires to include weekend weather conditions or if the activity is extended more than one week)
- Clear tape
- Marking pens
- Paper punch
- Date stamp
- Brads
- Pictures of different weather conditions cut from magazines and newspapers. Use actual photographs if available.

Procedures

1. Provide a Weather Book Station with construction paper, marking pens, drawing paper, brads, tape, paper punch, and date stamp. Place photographs of weather conditions around the station. Print the appropriate word(s) such as cloudy, rainy, sunny, partly cloudy, windy, cold, or hot under each picture.

2. Tell students that they will be making their own weather books and will be able to work on them each day for a week. Tell students that the books will be taken home at the end of the week.

3. During morning organizational time, have students discuss the daily weather conditions and how they might illustrate the weather for their books. Ask questions such as:

   a. What is the weather like today?
   b. What do you think the weather is going to be like this afternoon?
   c. How do you think you could draw today's weather?
   d. How else do you think you could draw today's weather?

OUTCOME 29 (Continued)
Procedures (Continued)

4. Have students draw their interpretations of the day's weather on drawing paper and date their drawings with the date stamp. Write the students' dictated daily weather conditions on their illustrations.

5. Have students label their drawings by using the appropriate word(s) from the Weather Book Station.

6. Instruct the students to make a cover for their books from construction paper, to punch holes in the covers (front and back covers) and daily weather illustrations with the paper punch, and to insert brads in the holes to secure the book. If necessary, use tape to reinforce the holes.

Extension

Repeat the activity as seasonal weather conditions occur.

KINDERGARTEN
EARTH SCIENCE

UNIT: Weather and Seasonal Changes
TOPIC: Seasonal Weather Changes
OUTCOME: 30. Identify the four seasons.

Background

The four seasons are experienced differently in various parts of Alabama. North Alabama usually experiences snow and a definite winter, while the Gulf Coast area only has a limited number of cold days. Seasonal differences taught in the classroom should be changes that students can observe in their immediate environment.

Materials

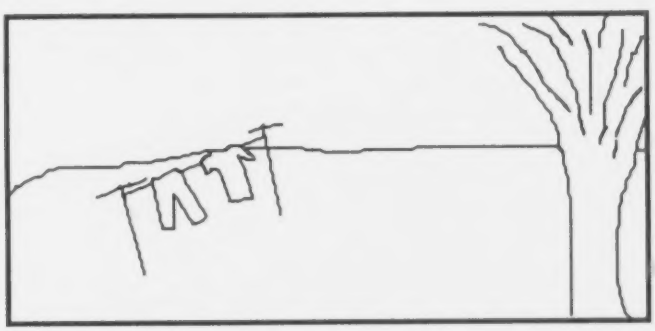
- Tree bark, separate pieces or a section of bark that has fallen from a tree
- Background paper for a mural or bulletin board
- Tree limbs, depending on size of bulletin board
- Cord
- Pictures of a child's clothing

raincoat	mittens and toboggan
galoshes	swim suit
umbrella	hat with snap under neck
warm jacket	sweater

- Sun, cloud, cloud-covered sun, snowflakes, raindrops made of poster board (optional)
- Glue or rubber cement
- Brown poster board
- Thumb tacks or staples
- Construction paper
- Dowel cut into four sections to use as posts for a clothesline

Procedures

1. Use the background paper to cover a bulletin board similar to the one sketched below.



OUTCOME 30 (Continued)
Procedures (Continued)

2. Cut a tree trunk from the brown poster paper and glue on bark pieces, or attach the section of bark to the bulletin board.

3. Attach the limbs to the trunk on the bulletin board to make a tree.

4. Use the cord to construct a clothesline on the bulletin board large enough to hang the pictures of clothing for children. Use dowel sections for posts.

5. Locate deciduous trees (those that lose their leaves in winter) on the school grounds or in close proximity to the school. Let the class, by voting on their favorite tree, elect a "class tree" from those appropriately identified.

6. Have the students visit and observe the "class tree."

7. Upon returning from the trip to the "class tree," have the students make the tree on the bulletin board look similar to their tree by adding student-drawn moss, lichen, insects, birdnest, or other things found on or in the tree.

8. Periodically through the year, make visits to the "class tree," observe any changes, and change the bulletin board tree accordingly.

9. When students notice leaves changing colors, falling, or new leaves appearing, use this opportunity to discuss seasonal changes.

10. Hang pictures of clothing on the clothesline that represent seasonal weather conditions.

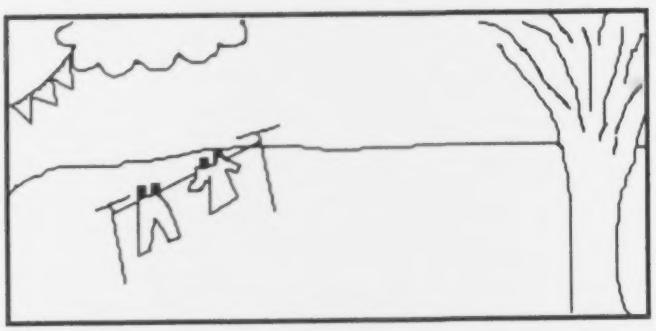
11. Relate seasonal changes to the "class tree" and to the weather conditions represented by the clothes hanging from the clothesline.

Extensions

Use cotton or burlap fabric as background for the bulletin board. It will last all year without fading.

OUTCOME 30 (Continued)
Extensions (Continued)

Introduce traditional weather signs such as sun, cloud, sun partially covered by clouds, snowflakes, wind, and raindrops by using pictures of these conditions on the bulletin board.



KINDERGARTEN
PHYSICAL SCIENCE

UNIT: Matter
TOPIC: Forms of Matter
OUTCOME: 31. Identify different forms of matter: solids, liquids, and gases.

Background

Matter, anything that has mass and takes up space, is commonly found in all three of its forms. Solids (forms of matter that have definite shapes and volumes) are represented by tables, chairs, blocks, books, and ice cubes. Liquids (forms of matter that take the shapes of their containers but have a specific volume) are represented by milk, orange juice, soft drinks, and water. Gases (forms of matter with neither a specific volume nor a specific shape) are represented by carbon dioxide, air (a mixture of a variety of gases), and water vapor.

Gases present a particular problem for young students. Because some common gases (such as those in air) are odorless, tasteless, and colorless, their presence must be inferred from indirect evidence, such as the movement of air (wind) or the increase in size of a balloon when it is inflated. Consequently, for young students who learn through direct sensory experience rather than through inference, the emphasis should be placed on solids and liquids as forms of matter.

The gaseous state of water (water vapor) is frequently misidentified. The white cloud that forms above a source of boiling water is water vapor. Water vapor is clear and colorless. It is the material that is not seen between the source of boiling water and the cloud of water vapor which forms.

The ice cubes should be allowed to melt into liquid water without the application of additional heat. Consequently, this part of the activity will take a lengthy period of time. The cups with the ice cubes could be set aside to melt while the students are involved in other curricular activities and then the results discussed later in the day.

Although kindergarten students usually cannot read or write, recording the observations in the form of an experience chart is a good procedure. In this way students will begin to make the connection between oral and written language, will have a record of their investigations, and will begin to experience the process of collecting and recording data.

OUTCOME 31 (Continued)

Materials

- Hot plate
- Ice cubes (2)
- Heat-proof glass container
- Pot holder or kitchen mitt
- Heat-proof surface on which to put the hot container

For each student:
- Ice cube
- Clear plastic cups (2)
- Paper Towels

Procedures

Part A: Solids

1. Provide each student with an ice cube in a clear plastic cup. Have the students observe their ice cubes using all of their senses. Collect the observations as part of an experience chart. Emphasize the idea that the ice cube has its own "special" shape.

2. Have the students name other objects in the classroom that have their own "special" shapes. List the objects named as a part of the experience chart.

3. After the list of objects is made, introduce the term "solid" and define the term as an object that has its own shape.

4. Ask students to name some other solids in the classroom or at home, and add these to the experience chart.

Part B: Liquids

1. Ask students to predict what will happen to their ice cubes if they let them sit in the cups for a long time. Record their predictions as a part of the experience chart.

2. Allow the cups to sit undisturbed until the ice cubes melt.

3. Give students another clear plastic cup. Have the students observe the liquid water resulting from the melted ice cubes. Ask students to pour it back and forth between the two cups. Collect any observations made as a part of the experience chart.

4. Have students name other materials that are like water. List the materials named on the experience chart.

OUTCOME 31 (Continued)
Procedures (Continued)

5. After the list is made, introduce the term liquid, and define the term as a material which can be poured and which can change its shape easily.

6. Ask students to name some other liquids, and add the new examples to the list on the experience chart.

Part C: Gases

1. Show the hot plate, heat-proof glass container, and two ice cubes. Review with the students that the ice cubes are solids.

2. Ask students to predict what will happen if the ice cubes are heated. Record the predictions on the experience chart.

3. Heat one of the two ice cubes until it melts. Compare the resulting liquid water to the solid water of the ice cube. Review the term liquid with the students.

4. Continue to heat the liquid water. Have the students observe the liquid water as it boils and then evaporates. Record student observations as a part of the experience chart.

5. Ask students questions such as:

   a. Is there the same amount of water after heating as there was before heating?
   b. What could have happened to the water?
   c. Can you see the water that went into the air?
   d. How is the water that went into the air like air?

6. Emphasize that the water which was boiled changed into something invisible with no shape. Give the term gas to this type of matter. Tell students that air is another type of gas.

KINDERGARTEN
PHYSICAL SCIENCE

UNIT: Matter
TOPIC: Forms of Matter
OUTCOME: 32. Identify matter using the five senses.

TOPIC: Changes in Matter
OUTCOME: 33. Demonstrate and observe changes in matter.

Background

Matter is something that has weight and takes up space. Matter has four forms: solids, liquids, gases, and plasma. Plasma occurs only under very specific conditions. The concept of gases is difficult for young students to comprehend. Steam from cooking provides a good opportunity to introduce the concept of gases.

This activity involves using the five senses to identify plant matter and is designed for small groups to facilitate increased opportunities for thought-provoking discussion.

Materials

- Vegetables (1 from the home of each student)
- Electric deep cooker or electric skillet
- Canned tomato sauce (1 small can)
- Bouillon (1 cube or can)
- Knives (2 sharp knives and 2 table knives)
- Large spoon for stirring and serving

For each student:

- Hot/cold plastic cup
- Plastic teaspoon
- Salt and pepper
- Pail of water
- Paper Towels
- Vegetable peeler

Procedures

1. Tell students this activity involves making "Anything Vegetable Soup."

2. Send a note to parents requesting that they send a vegetable to school on a specified date. Suggest vegetables such as carrots, celery, onions, potatoes, tomatoes, corn, and cabbage.

OUTCOMES 32 and 33 (Continued)
Procedures (Continued)

3. Introduce the activity by stressing the need of cleanliness of utensils, hands, and vegetables to ensure healthy cooking.

4. Have small groups of students assist in the preparation of the vegetables for the soup. This includes washing the vegetables, peeling if necessary, chopping into bite-sized pieces, and putting into the cooker or skillet.

5. Have students taste the vegetables in a raw state and describe how they taste. Ask questions about each vegetable such as:

   a. What does it look like?
   b. How does it feel?
   c. What does it smell like?
   d. How big is it?
   e. What do you think it will smell like as it is cooking?
   f. What else smells like this vegetable?
   g. What solid matter did we add?
   h. What liquid matter did we add?

6. Add the liquid tomato sauce and bouillon. Add salt and pepper to taste.

7. Cook until vegetables are soft and the mixture is soupy. Add water if needed to prevent burning.

8. As the soup cooks, point out the steam that is rising from the hot liquid. Explain that steam is a gas and that it is a result of the liquid (water) getting so hot that it can no longer remain a liquid. Explain that a gas is a form of matter. Give the example that ice cubes can get hot and turn to liquid. Ask students for other examples of gases.

9. Serve the soup in hot/cold plastic cups. Give each student a plastic spoon and cup of soup.

10. Ask the students to describe what they taste. Ask the following questions: Are you eating a solid or a liquid? How do you know? Did any of the ingredients change after they were cooked?

Extension

Blindfold students and give them vegetables and liquids to feel to identify the form of matter presented. (Caution: Some young students have a fear of being blindfolded.)

KINDERGARTEN
PHYSICAL SCIENCE

UNIT: Matter
TOPIC: Changes in Matter
OUTCOME: 33. Demonstrate and observe changes in matter.

Background

This activity demonstrates a physical change in matter from a liquid to a solid. Making ice cream in self-sealing plastic bags allows the students to observe the change as it happens. If possible, allow the students to observe or help make the ice-cream mixture.

Taking away heat (energy) from matter makes molecules move more slowly and come closer together. If enough energy is removed, the liquid freezes and a solid is formed. The temperature at which freezing takes place is called the FREEZING POINT. Every liquid has its own freezing point.

In the presence of salt, ice melts. The process of ice melting removes heat from the ice-cream mixture causing it to freeze. Since salt causes ice to melt faster, more heat is absorbed. In making ice cream, the heat is absorbed from the ice-cream mixture to the salt and water. Stirring or shaking adds air to the ice-cream mixture and increases the smoothness of the texture of the ice cream.

The history of ice cream goes back as far as A.D. 62 when runners brought snow from the nearby mountain to the Roman Emperor Nero. For Nero's pleasure the ice was flavored with honey and juices.

In the 1200s, Marco Polo brought a sherbet recipe home from his trip to the Far East. Sherbet is made with ice and milk. The making of sherbet spread to France in the 1500s where the people originated many new recipes. George Washington liked sherbet so much that he spent $200 on the dessert one summer. Sherbet was hard to make before refrigeration and electricity. Ice had to be collected from rivers and stored in sawdust for later use. Ice cream was a treat for the rich. Ice cream became more easily available when a lady named Nancy Johnson invented the hand-cranked ice-cream freezer. With electricity and refrigeration, ice cream became cheaper to produce.

OUTCOME 33 (Continued)

Materials

- Alcohol thermometer
- STATION CARDS
- Stapler

For ice-cream mixture (Serves 7):

- Egg
- Sugar, 120 ml (1 cup)
- Heavy cream, 600 ml (2 1/2 cups)
- Vanilla, 5 ml (1/8 teaspoon)
- Milk, 250 ml (1 cup)
- Large bowl
- Mixer, hand beater or blender

For freezing, for each student:

- Self-sealing plastic bag (quart size)
- Self-sealing plastic bag (sandwich size)
- Ice-cream mixture, 120 ml (1/2 cup)
- Rock salt, 120 ml (1/2 cup)
- Crushed ice, 500 ml (2 cups)
- Spoon
- Measuring cups (1 cup and 1/2 cup)

Procedures

1. In a large group setting, discuss ice cream with students by asking questions such as:

   a. Where do we buy ice cream? (We buy ice cream at the grocery store.)
   b. What ingredients are in ice cream? (Answers will vary.)
   c. Could we make ice cream at school? (Yes.)
   d. How? (Answers will vary.)

2. Tell students that they can make ice cream using a recipe that will be given to them.

3. Have students help prepare the ice-cream mixture. Stress clean conditions at all times. Explain that careful measurements must be completed. Use a hand beater, electric mixer, or blender to blend the mixture. Record the temperature of the mixture at this point.

OUTCOME 33 (Continued)
Procedures (Continued)

4. Place STATION CARDS 1-5 on a shelf or a desk that is easily accessible to students. Demonstrate what should be completed at each station.

5. Allow students, one at a time, to prepare self-sealing plastic bags for shaking. (This activity requires a lot of shaking. Consideration might be given to pairing the students for this procedure.)

6. Have students shake their bags. Explain that it should take ten to fifteen minutes for the ice cream to freeze. Stress that students should not stop to rest. Explain that the more rhythm or regularity in the shaking, the smoother the ice cream will be. To keep smooth rhythm, use a song or a record with a definite beat. Be sure the students are not too vigorous in the shaking procedure, as the sandwich bags will open and get salt in the ice-cream mixture. Add more salt or ice, if and when needed.

7. Record temperature of one student's ice cream when it is frozen. Compare this temperature with the temperature before freezing.

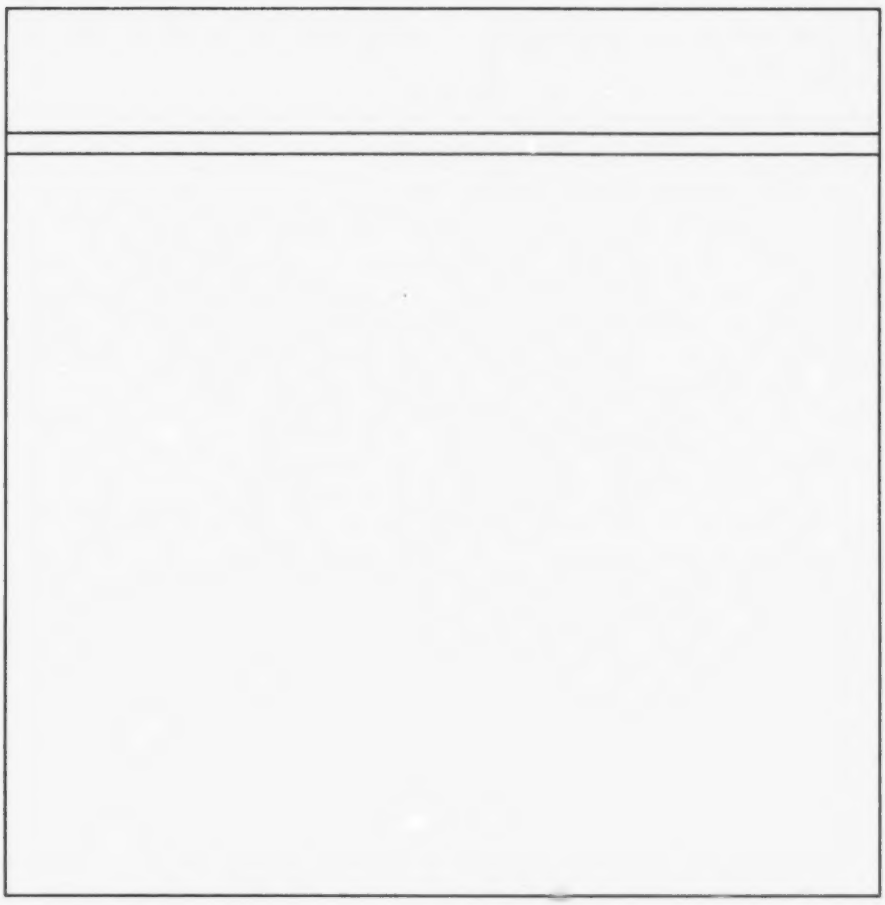
8. Compare the texture and quality of different students' ice-cream mixtures. Have students determine which ones are best and why. Ask students how long the best-tasting ice creams were shaken. Ask how the mixture was shaken.

9. Have students remove the sandwich bags from the larger bags. Give students spoons and allow them to eat the ice cream.

10. Have students describe the consistency of the ice-cream mixture as it changed to ice cream.

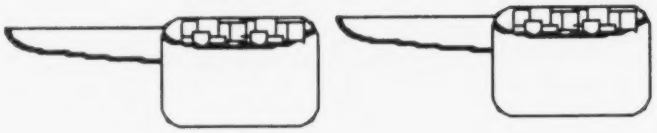
STATION CARD 1

Take 1 large plastic bag.



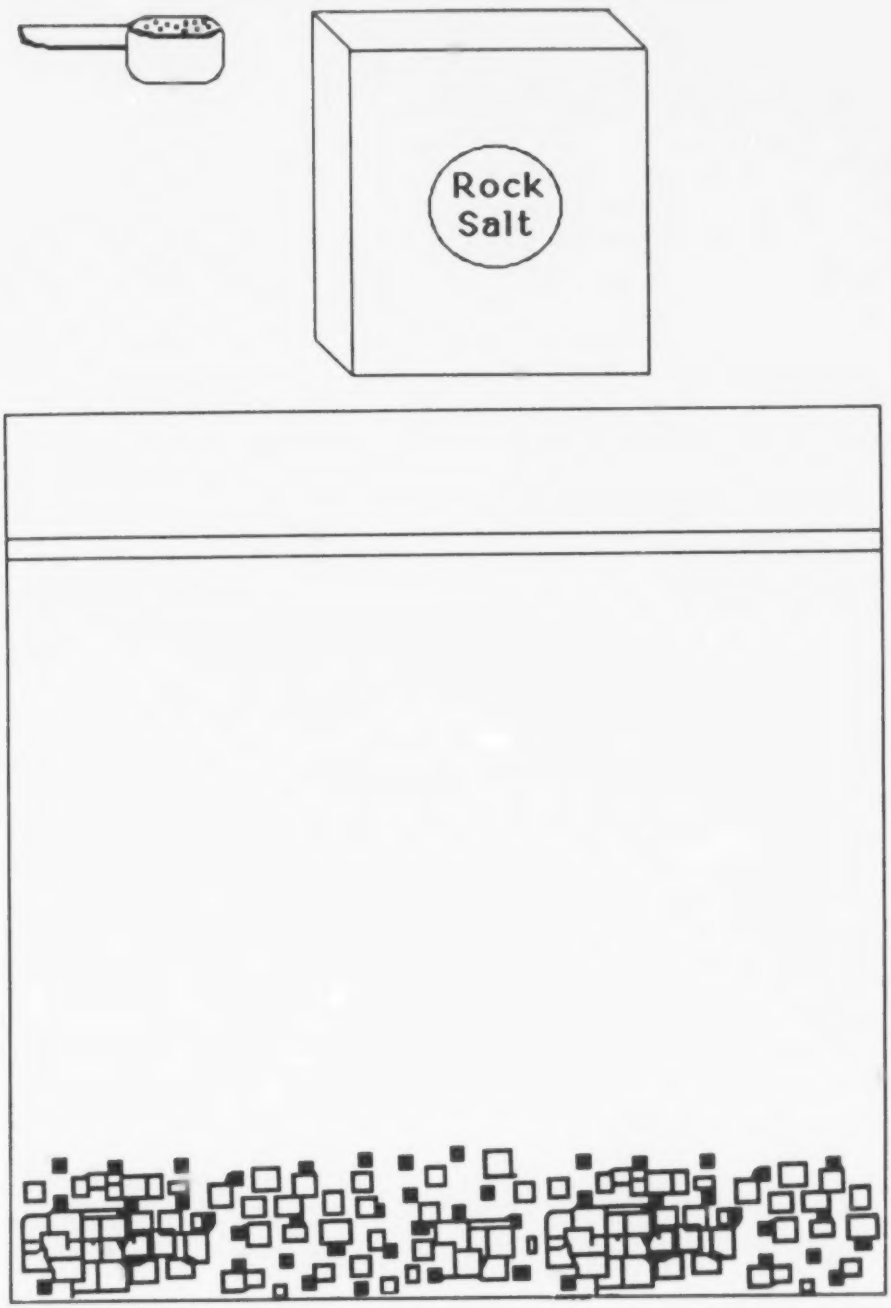
STATION CARD 2

Put 2 cups of ice into the bag.



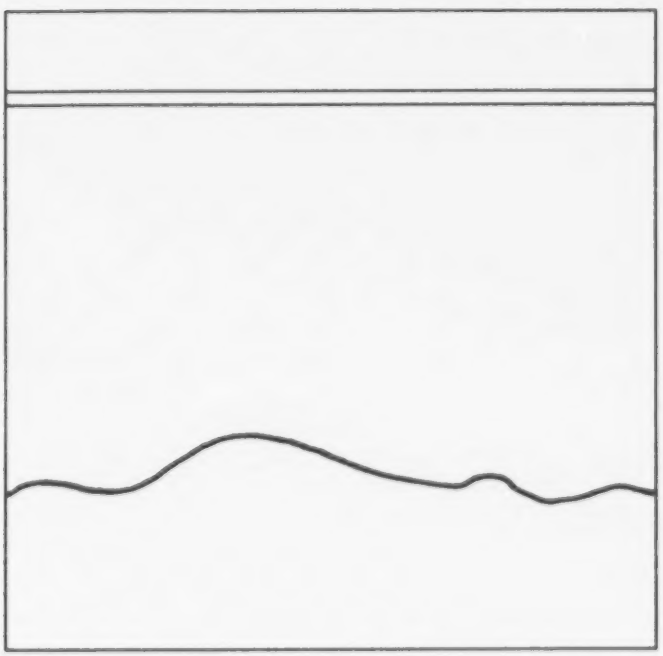
STATION CARD 3

Add 1/2 cup of rock salt.



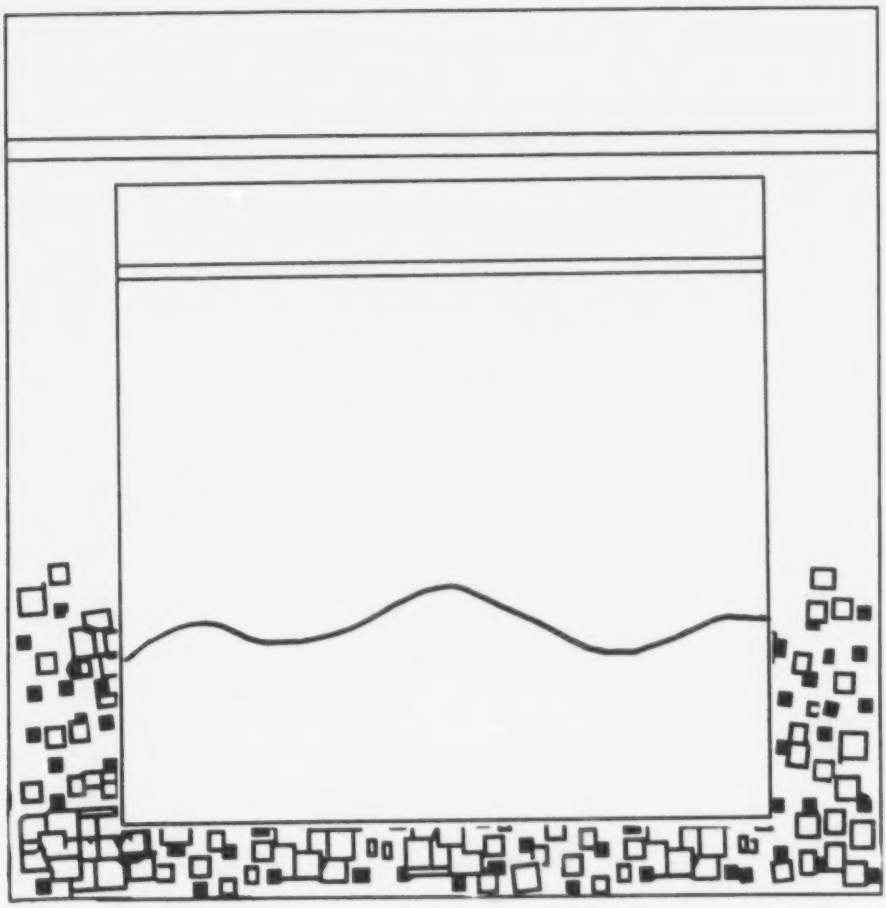
STATION CARD 4

Take 1 small bag of ice cream mixture.



STATION CARD 5

Place small bag inside of large bag.



KINDERGARTEN
PHYSICAL SCIENCE

UNIT: Machines
TOPIC: Uses of Machines
OUTCOME: 34. Observe use of simple machines in everyday school activities.

TOPIC: Effect on Work
OUTCOME: 35. Discover that machines are used to make many kinds of work easier.

Background

A machine is a device used to make work easier. Examples of simple machines are pulley, lever, screw, wheel and axle, inclined plane, and wedge. Examples of work that people do with their bodies are sweeping, carrying things, lifting items from the floor, and loading blocks into a truck.

A prerequisite to this activity is the ability of each student to cut with scissors. This activity can be completed on an individual basis or with small groups of students when they obtain the skill level of cutting proficiently with scissors.

Materials

For each student:

- Scissors
- Handout: CIRCLE AND RECTANGLE (2)

Procedures

1. Give each student one handout CIRCLE AND RECTANGLE.

2. Instruct students to tear the paper on the lines to make a circle and a rectangle.

3. Ask students to name a machine that would make the task easier.

4. Give each student another handout CIRCLE AND RECTANGLE and a pair of scissors.

5. Instruct students to cut the circle and rectangle using a pair of scissors.

6. Ask the students:

   a. Did you notice any difference in the two tasks?
   b. What differences did you notice?
   c. What other machines make our work easier?

   Relate the activity to the fact that scissors are machines that make work easier.

OUTCOMES 34 and 35 (Continued)

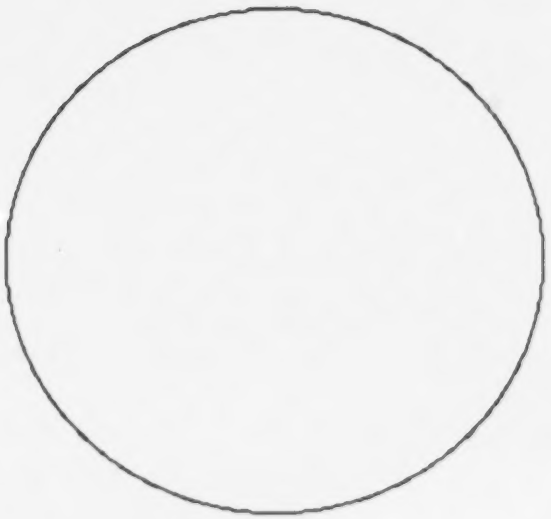
Extensions

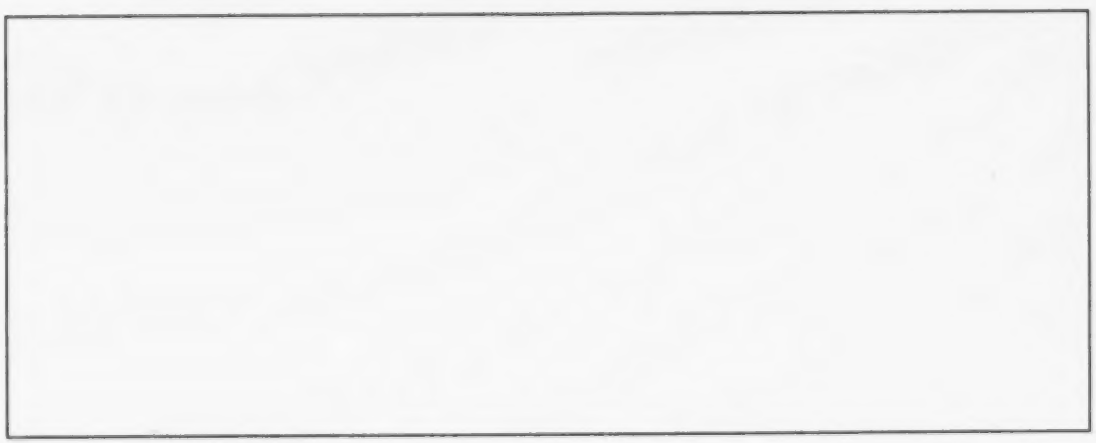
Hang a pulley. Discuss uses of a pulley.

Make a ramp (inclined plane). Discuss uses of a ramp.

Discuss types of jobs that require the use of machines to provide job effectiveness and efficiency.

CIRCLE AND RECTANGLE
Handout





KINDERGARTEN
PHYSICAL SCIENCE

UNIT: Machines
TOPIC: Uses of Machines
OUTCOME: 34. Observe use of simple machines in everyday school activities.

TOPIC: Effect on Work
OUTCOME: 35. Discover that machines are used to make many kinds of work easier.

Background

A machine is an object made up of two or more moving or nonmoving parts used for doing some kind of work. A machine may or may not be operated by the hand or hands, but it will usually make work easier.

Machines need people or some other form of power to make them work. Some machines that are used in everyday school activities are pencil sharpeners, scissors, overhead projectors, record players, file drawers, paper punches, clocks, and equipment for cooking activities. Machines may also be found on playgrounds. Slides, swings, skates, wagons, tricycles, wheelbarrows, and other wheel toys may be classified as tools or machines. Depending on the uses, tools can be machines.

This activity is designed for a small group of students. The students manipulate the fork, wire wisk, and rotary egg beater. The teacher should operate the electric mixer.

Materials

- Soap flakes, (1 box)
- Bowl, large
- Fork
- Wire wisk
- Rotary egg beater
- Dark construction paper
- Water
- Electric mixer, portable

Procedures

1. Explain to students that they are to finger paint with soap suds and that they need to make the soap fluffy.

2. Give a small group of students a large bowl containing some soap flakes and a little water, a fork, and a wire wisk.

3. Ask the students to whip the mixture to make it fluffy.

Procedures (Continued)

4. After the the students have had the opportunity to try each tool, show the students the rotary egg beater and ask if they think it would make their job easier. Introduce the word machine. Discuss the fact that a rotary beater has moving parts. This machine is operated by hand. Each student should be given the opportunity to operate the rotary beater.

5. After students work with the rotary beater, ask them if their work was made easier by using a machine.

6. After each student has had an opportunity to try the rotary beater, introduce the electric mixer as a machine using an electric source.

7. Demonstrate how easily the task is finished by using the electric mixer.

8. Ask the students:

   a. Did you find it easy to make the soap suds fluffy?
   b. Which way did you find easiest?
   c. Why do you think that particular method made it easier?
   d. What other items do we use to make our work easier?

9. Have students put soap suds on dark construction paper and finger paint.

Extensions

Have a display of simple tools and machines on the discovery table.

Visit a building site and observe workmen using machines.

Examine an old wind-up clock to see the gears and wheels.

KINDERGARTEN
PHYSICAL SCIENCE

UNIT: Magnets
TOPIC: Uses of Magnets
OUTCOME: 36. Demonstrate use of magnets in daily living.

Background

Magnets and magnetism are used daily in many ways. Magnets are used in simple ways, such as magnetic latches on doors and decorative note holders on refrigerators. Magnets can also help change electrical impulses into sound in telephones, televisions, and radios.

Students need many opportunities to explore the use of magnets in the classroom. Many objects, such as magnetic letters, flashlights with magnetic holders, magnetic clips, and magnetic note holders, should be available for students to attach to appropriate surfaces.

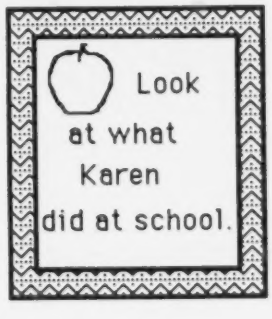
This activity allows each student to construct a magnetic note holder to use at home to display his or her work on the refrigerator.

NOTE: A magnet can be demagnetized by a sharp blow to a hard surface.

Materials

- Objects with magnets (See background)

For each student:
- Glue
- Crayons
- Magnetic strip
- Clothespin
- Tongue depressor
- Sign, individualized with student's name



Procedures

1. Display objects with magnets.

2. Discuss the use of each object and demonstrate the function of the magnet by attaching the object to a metal surface (file cabinet).

3. Allow students to investigate by attaching each object to a metal surface.

4. Distribute the name sign and crayons to each student.

OUTCOME 36 (Continued)
Procedures (Continued)

5. Instruct students to decorate their signs by coloring the border and making a picture of an apple.

6. Have each student construct a magnetic note holder by following the directions below:

   a. Glue the clothespin to the tongue depressor.
   b. Glue the magnetic strip to the back of the tongue depressor.
   c. Glue the sign to the top of the tongue depressor.

Extension

Encourage students to use magnetic letters on cookie sheets or file cabinets to make their names and to match upper and lower case letters.

KINDERGARTEN
PHYSICAL SCIENCE

UNIT: Magnets
TOPIC: Attraction of Magnets
OUTCOME: 37. Demonstrate that magnets are attracted to some kinds of matter.

Background

Mr. Mouse and his Marvelous Magnet Mitten will help students discover that magnets attract objects made of iron, steel, nickel, or cobalt.

Prior to the activity, construct a mouse puppet and a magnetic mitten.

Make a "Yes/No" chart on poster board.

Materials

- Pattern: MR. MOUSE PUPPET
- Pattern: MARVELOUS MITTEN
- Format: YES/NO CHART
- Poster board
- Colored felt
- Small magnet
- Collection of common objects in a box

crayon	paper
paper clip	plastic spoon
string	penny
washer	candle
rubber band	screw
nail	cooking foil
key	eraser
pins	

Procedures

1. Display the collection of objects, Mr. Mouse, and his Marvelous Mitten. Explain that the mitten has a magnet attached.

2. Place the YES/NO chart on a table or on the floor.

3. Using only one hand of Mr. Mouse, have students try to pick up the objects. Then have students place the magnetic mitten on the puppet and try again to pick up the objects.

4. Direct students to place the objects that the magnet attracts on the side of the chart marked "Yes" and to place all items that are not attracted by the magnet on the side of the chart marked "No."

OUTCOME 37 (Continued)
Procedures (Continued)

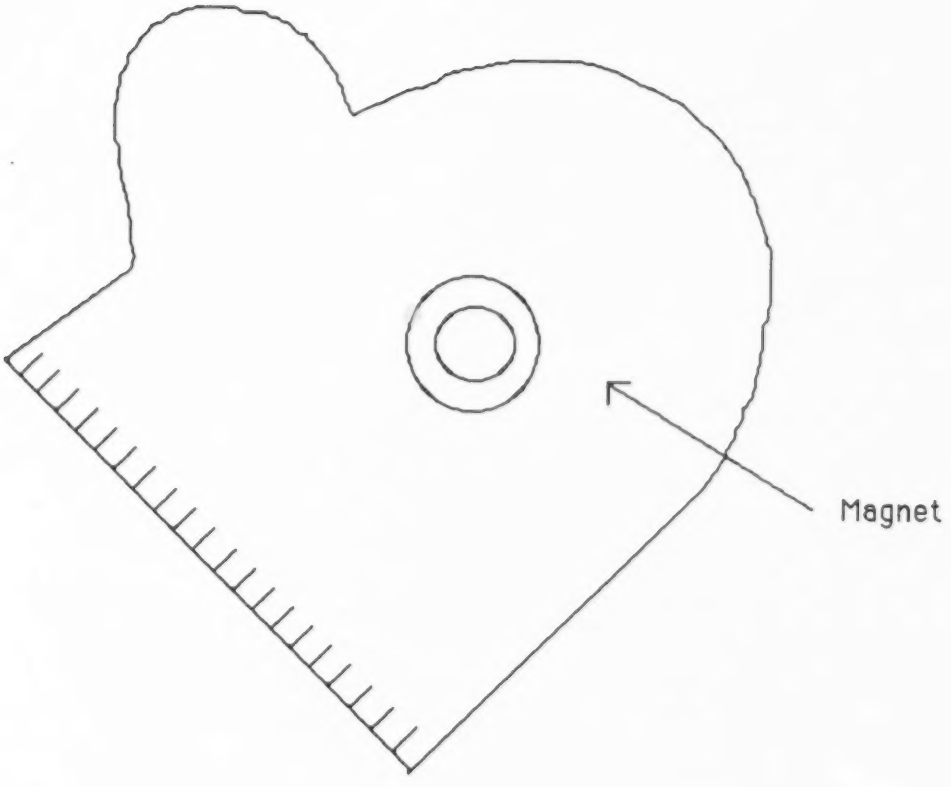
5. Ask students questions similar to the following about their findings:

   a. What objects did Mr. Mouse pick up with his magnet mitten? (Mr. Mouse picked up the nail, washer, key, screw, pins, and paper clip.)
   b. How are these objects alike? (All contain metal that the magnet will attract.)
   c. Why did the magnet not attract both spoons? (One spoon is made of plastic and does not contain metal.)

6. Have students return the objects to the box.

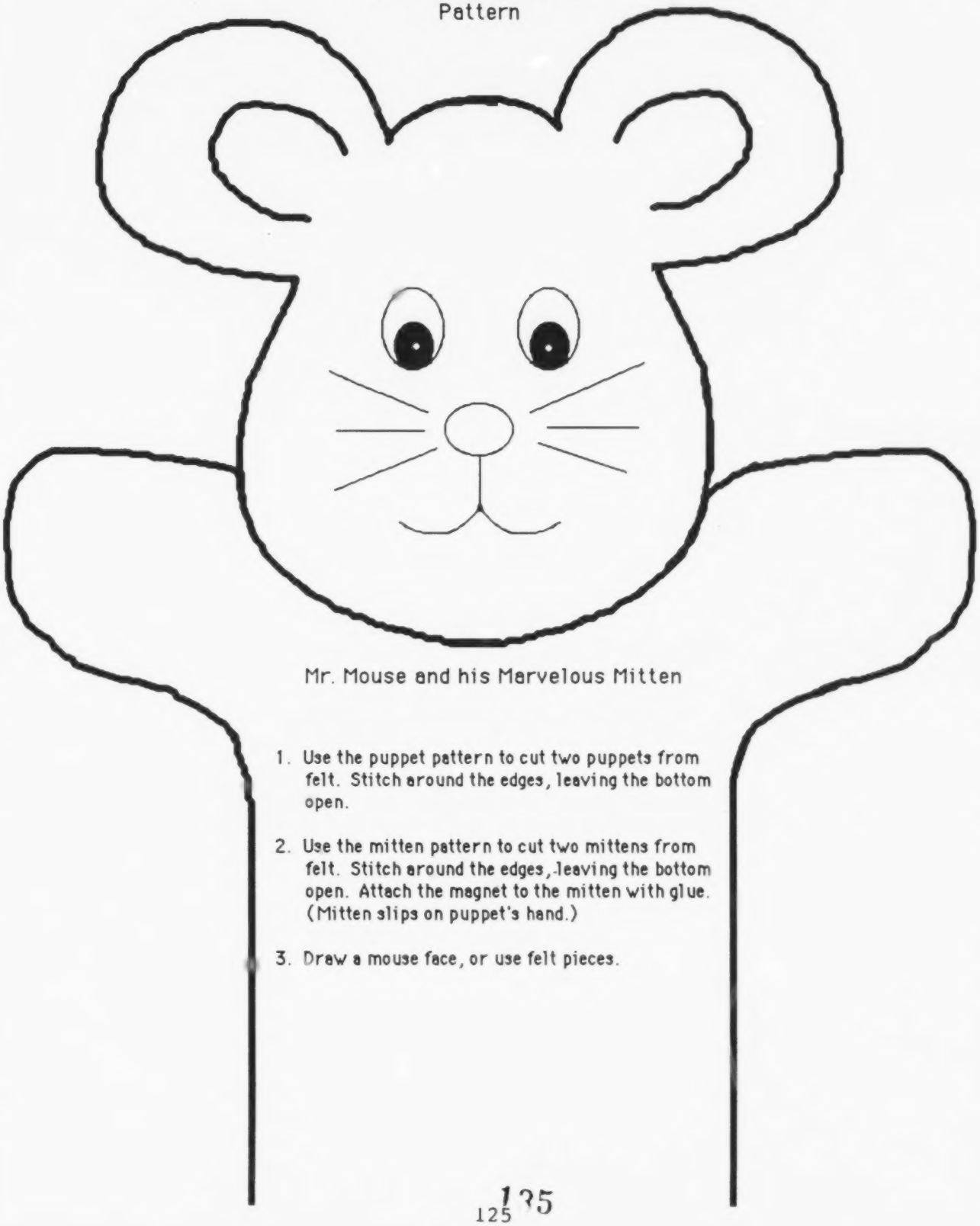
MARVELOUS MITTEN

Pattern



MR. MOUSE PUPPET

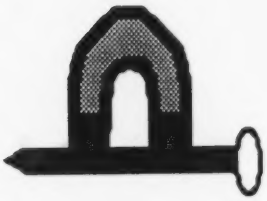
Pattern



Mr. Mouse and his Marvelous Mitten

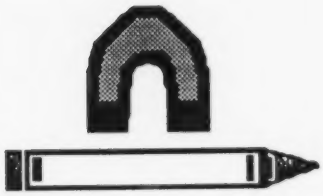
1. Use the puppet pattern to cut two puppets from felt. Stitch around the edges, leaving the bottom open.
2. Use the mitten pattern to cut two mittens from felt. Stitch around the edges, leaving the bottom open. Attach the magnet to the mitten with glue. (Mitten slips on puppet's hand.)
3. Draw a mouse face, or use felt pieces.

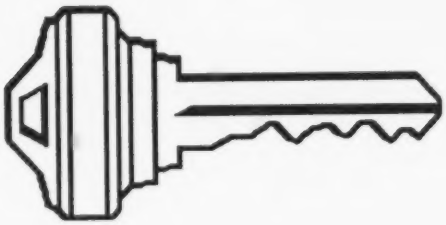
YES/NO CHART
Format

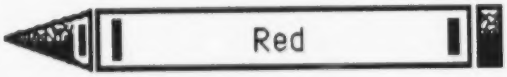


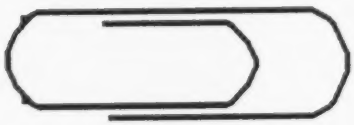
YES

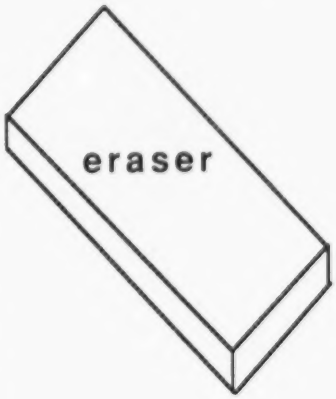
NO











KINDERGARTEN
CONTRIBUTIONS AND CAREERS IN THE FIELDS OF
LIFE SCIENCE, EARTH SCIENCE, AND PHYSICAL SCIENCE

UNIT: Contribution and Careers in Science
TOPIC: Contributions of Scientists
OUTCOMES: 38. Identify men and women who have contributed to the fields of Life Science, Earth Science, and Physical Science.

39. Describe what men and women have done in the fields of Life Science, Earth Science, and Physical Science.

40. Explain why an understanding of Life Sciences, Earth Sciences, and Physical Sciences can contribute to the quality of life in today's and tomorrow's society.

TOPIC: Career Opportunities
OUTCOMES: 41. Identify careers related to an understanding of Life Sciences, Earth Sciences, and Physical Sciences.

42. Explain how careers depend on a basic understanding of Life Sciences, Earth Sciences, and Physical Sciences.

Background

It is never too early to call attention to the important role that science and the people who work in science-related fields play in our lives. It is important that young children build realistic images of scientists and possible careers related to science and technology. A scientist could be a parent, a teacher, or a neighbor. Anyone who uses the scientific method of inquiry is a scientist to some degree.

Scientists are men and women who have studied and trained in the fields in which they are interested. Scientists who were and are members of minorities have been and continue to be assets to the world of science.

A knowledge of Life Sciences, Earth Sciences, or Physical Sciences is required for many careers. Some careers are mentioned in the study cards for this activity. The materials provided should be presented over a period of several weeks. If possible, have available a microscope, a telescope, and other laboratory equipment. Look for resource people who can talk to the students about science-related careers. Display pictures of different kinds of science equipment.

OUTCOMES 38, 39, 40, 41, and 42 (Continued)

Materials

- Study Cards: LIFE SCIENTISTS (5)
- Study Cards: EARTH SCIENTISTS (6)
- Study Cards: PHYSICAL SCIENTISTS (3)
- Study Cards: SCIENCE-RELATED CAREERS (8)
- Pictures of scientific apparatus such as a microscope, a telescope, and other laboratory equipment

Procedures

Part A: LIFE SCIENTISTS

1. Present the study cards LIFE SCIENTISTS to the students.

2. Discuss the kinds of scientists mentioned.

3. Discuss the kinds of equipment and training needed by these scientists.

Part B: EARTH SCIENTISTS

Repeat the procedures presented in Part A.

Part C: PHYSICAL SCIENTISTS

Repeat the procedures presented in Part A.

Part D: SCIENCE-RELATED CAREERS

First Session

1. Present the first study card SCIENCE-RELATED CAREERS.

2. Discuss why a knowledge of science is needed for these careers.

3. If possible, have a resource person in a science-related career visit the class and discuss the importance of science in preparing for his or her career.

Second Session

1. Present the study cards concerning engineers.

2. Discuss the work done by the various kinds of engineers.

3. Discuss why a knowledge of science is important to engineers.

4. If possible, have an engineer talk to the class.

OUTCOMES 38, 39, 40, 41, and 42 (Continued)
Procedures (Continued)

Third Session

1. Present the study card about technicians.

2. Discuss the importance of these careers.

3. Discuss why some knowledge of science is important for these careers.

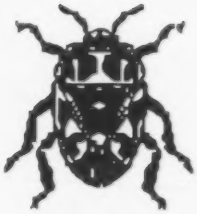
4. If possible, have a technician talk to the class.

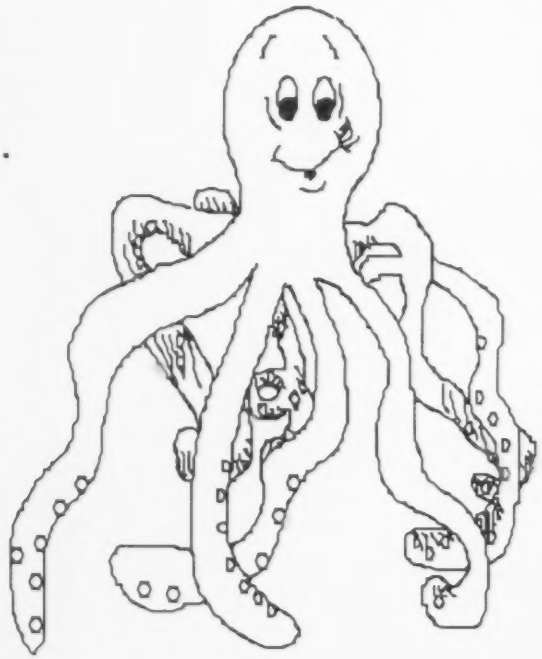
LIFE SCIENTISTS
Study Card

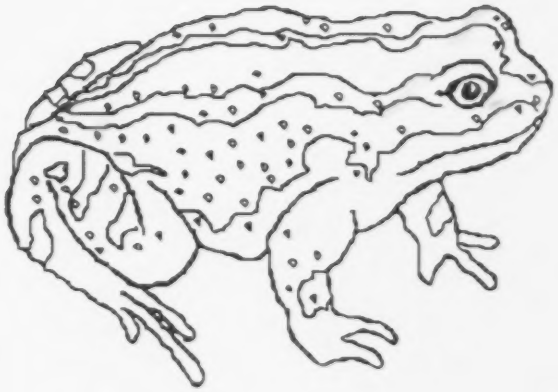
Life scientists

study

living things.

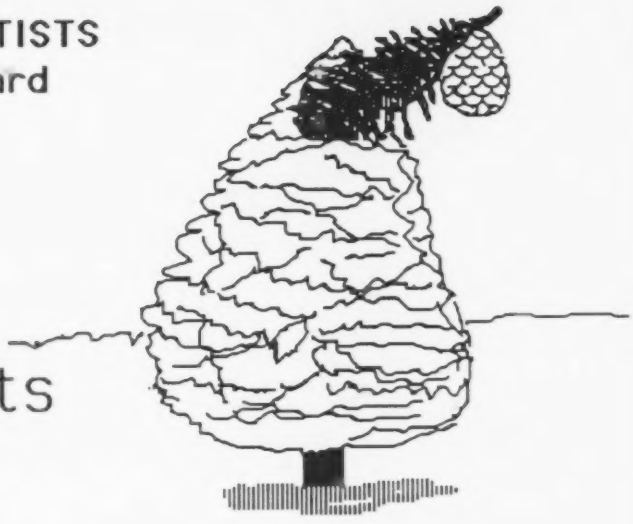






BEST COPY AVAILABLE

LIFE SCIENTISTS
Study Card

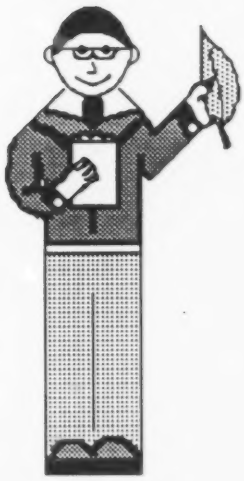


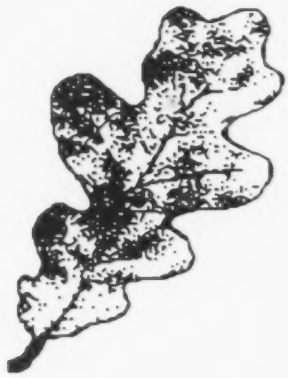
Botanists

study

plants and

how they grow.



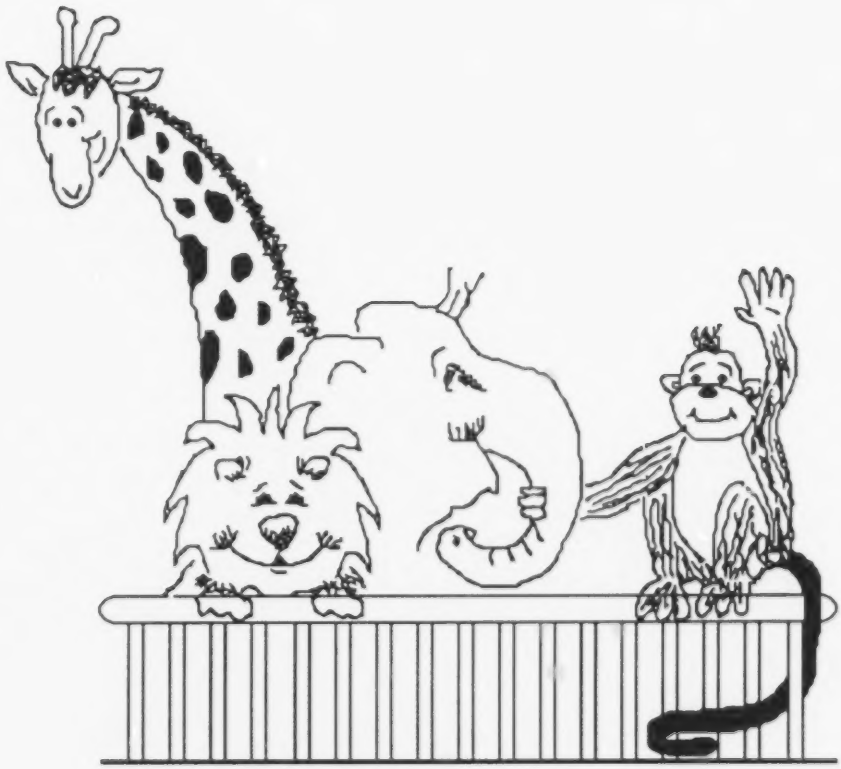


LIFE SCIENTISTS
Study Card

Zoologists

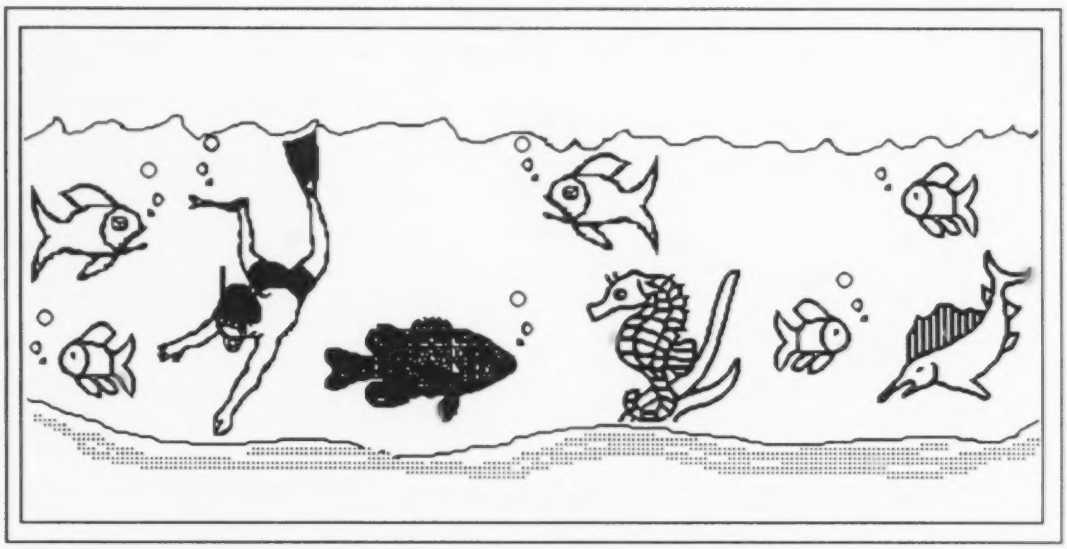
study

animals.



LIFE SCIENTISTS
Study Card

Marine biologists

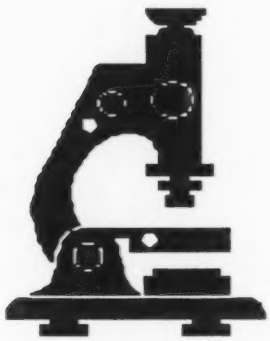


explore and study

life in the oceans.

LIFE SCIENTISTS
Study Card

Microbiologists



study very tiny organisms

such as bacteria and viruses.

Microbiologists use microscopes

to enlarge the images of organisms

too small to be seen by the unaided

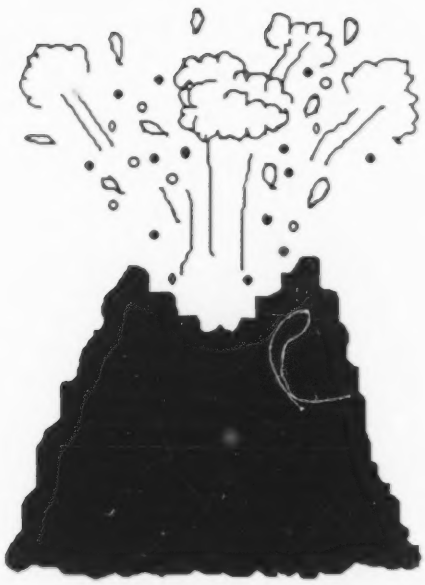
eye.

EARTH SCIENTISTS
Study Card

Earth scientists

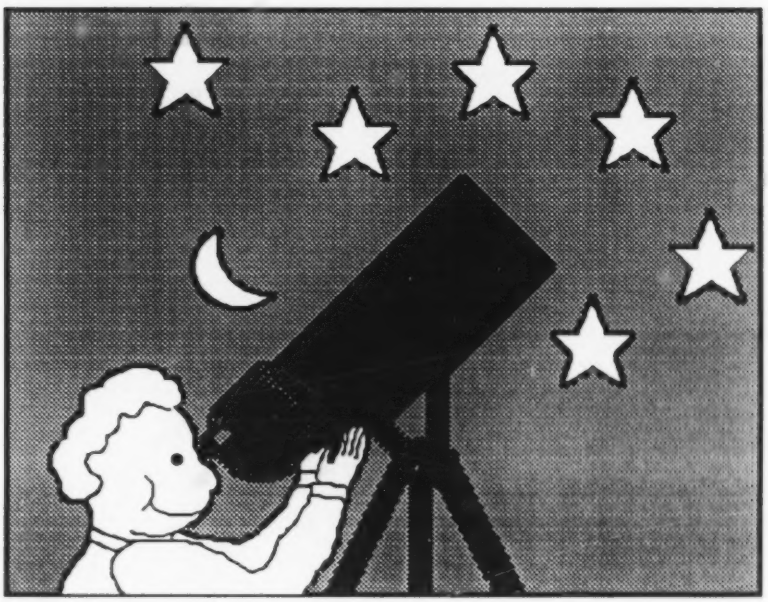
study

the earth and space.



EARTH SCIENTISTS
Study Card

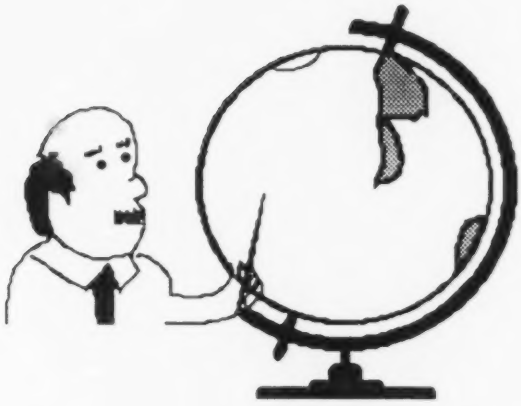
Astronomers



look to the heavens to find out about stars and planets.

EARTH SCIENTISTS
Study Card

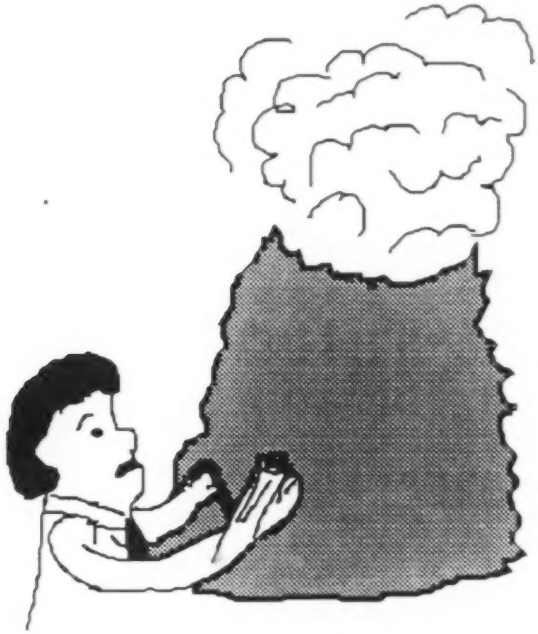
GEOGRAPHERS



study the earth and how living things adjust to where they live.

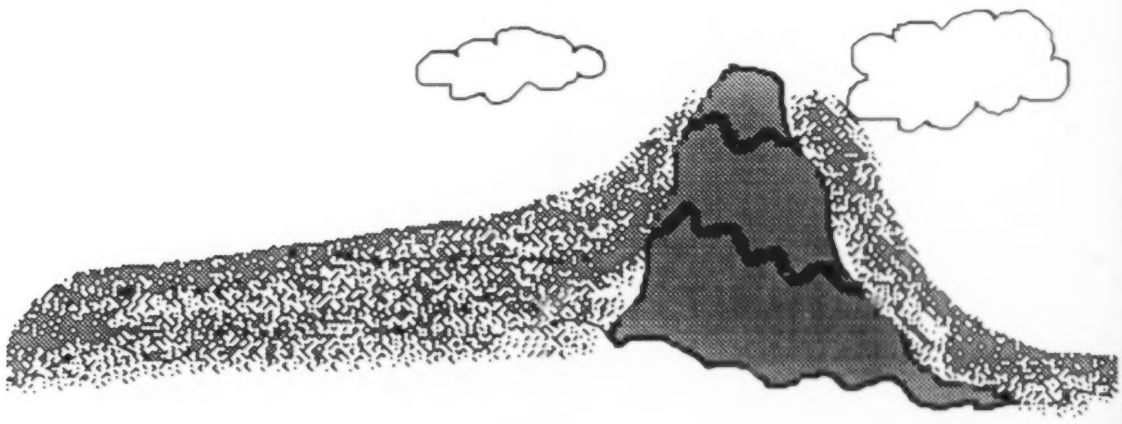
EARTH SCIENTISTS
Study Card

GEOLOGISTS

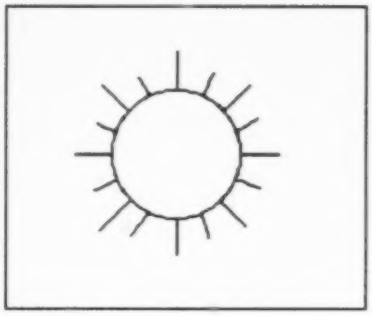


study the earth, including

rocks and volcanoes.



EARTH SCIENTISTS
Study Card



Mostly sunny,
warm
82/56

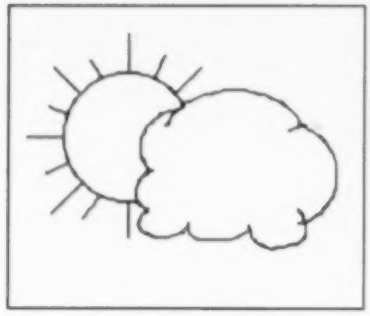
Meteorologists

study

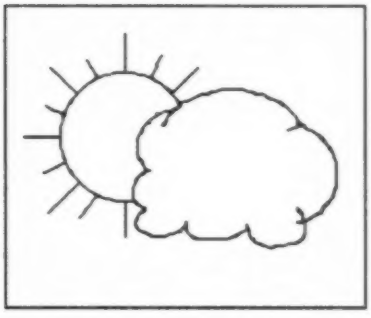
the weather

and the

atmosphere.

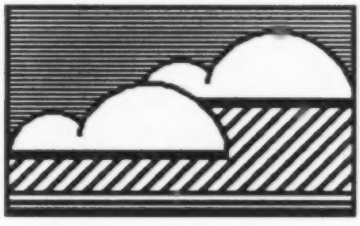


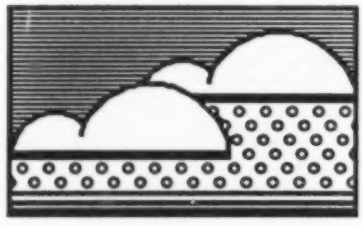
Clouds and sun
84/60



Some sunshine
84/62

Cloudier, showers
78/62



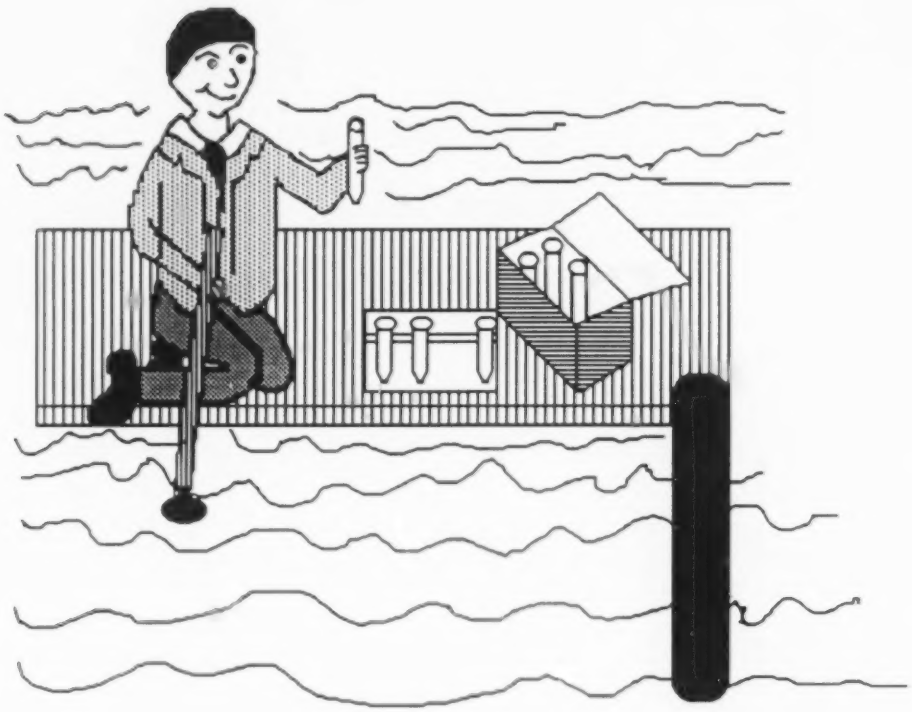


They tell us when it will

rain or snow or be clear

and warm.

Oceanographers



find out about the tides and the movements of the ocean. Oceanographers study plants and animals in the oceans and study underwater mountains and rocks.

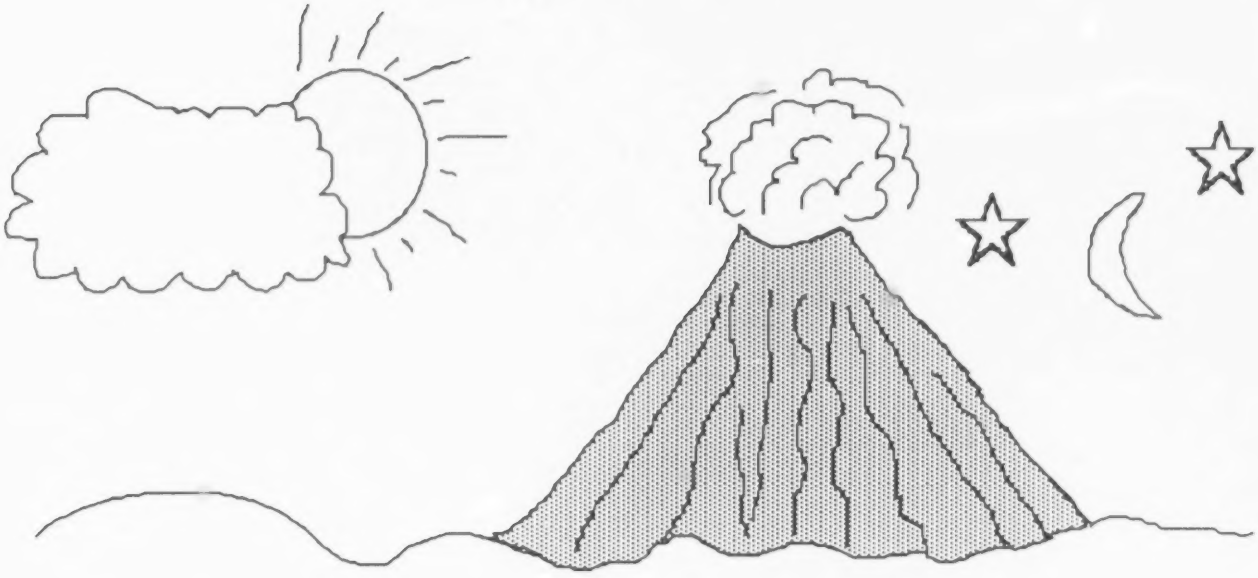
PHYSICAL SCIENTISTS
Study Card

Physical scientists

study

the nature of the

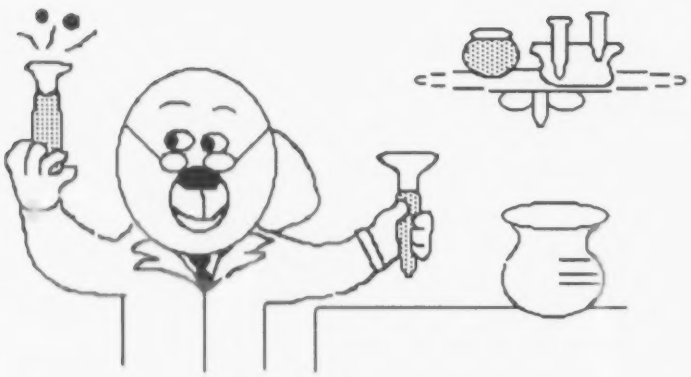
universe.



PHYSICAL SCIENTISTS

Study Card

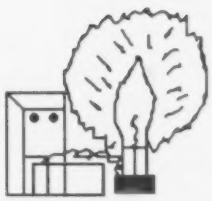
Chemists



study the way atoms
and molecules interact.

PHYSICAL SCIENTISTS
Study Card

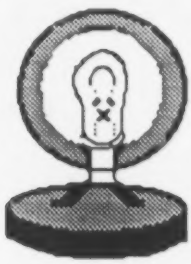
Physicists



study such things as

electricity, magnetism,

and gravity.



SCIENCE-RELATED CAREERS
Study Card

All of these people studied science in school:

Physicians

Pharmacists

Nurses

Medical Technologists

Engineers

Veterinarians

Opthalmologists

Optometrists

Dentists

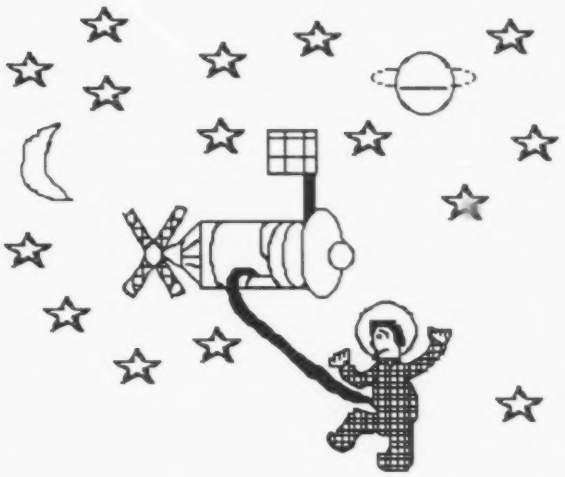
Teachers

Architects

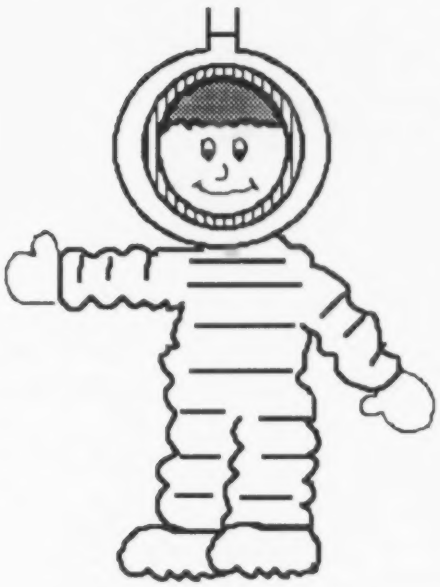
Technicians

SCIENCE-RELATED CAREERS
Study Card

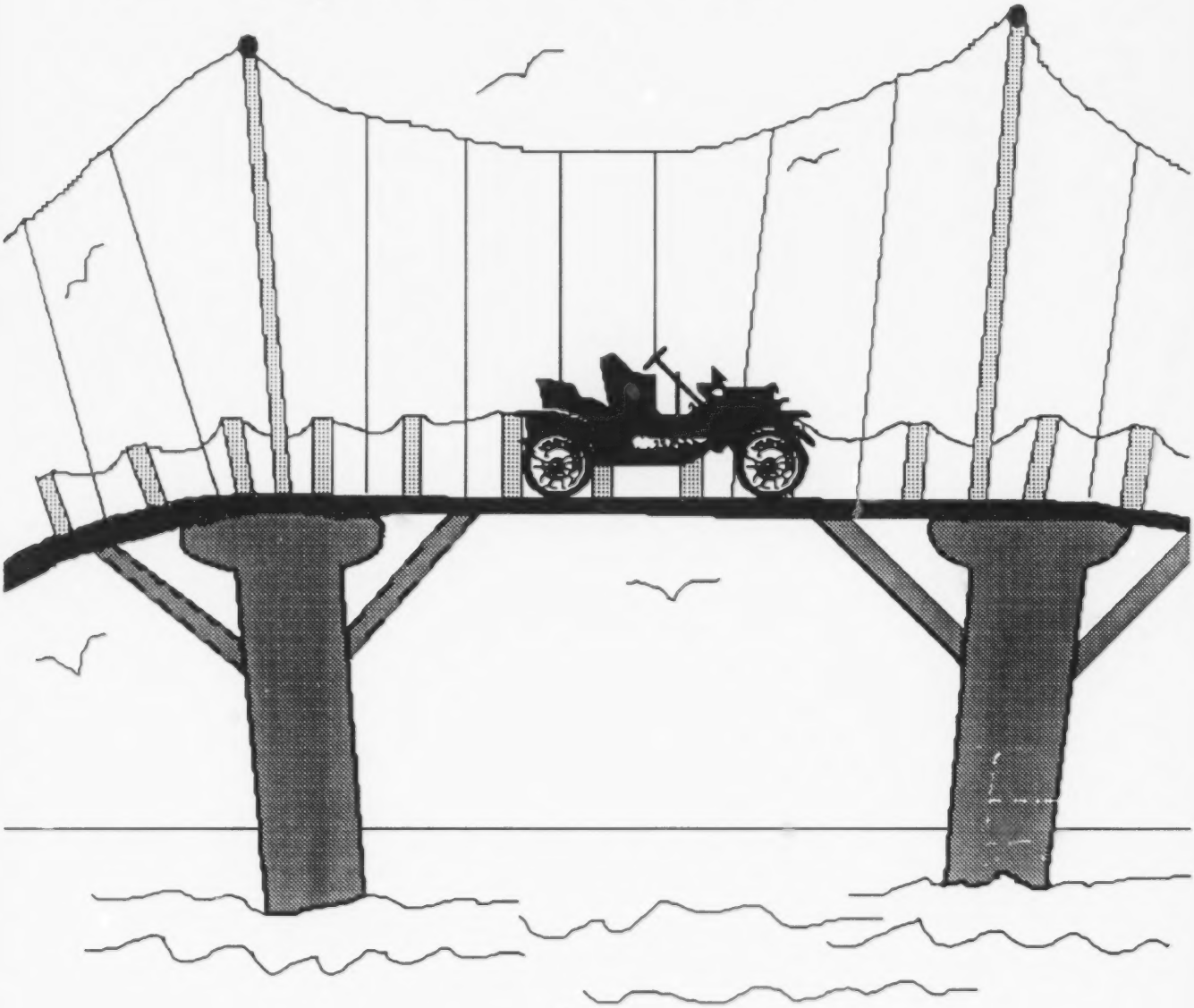
Engineers work with the discoveries made by scientists.



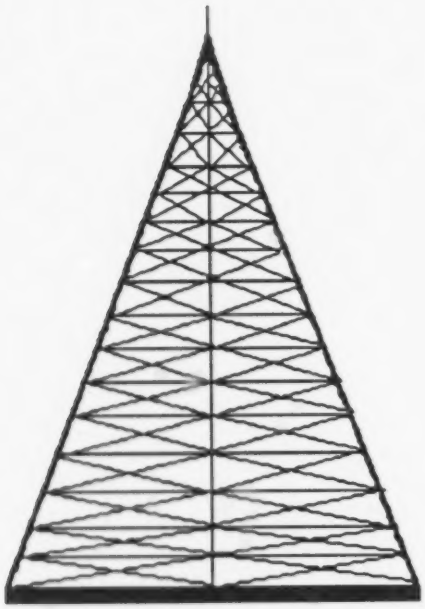
Aerospace engineers design aircraft, missiles, and spacecraft.



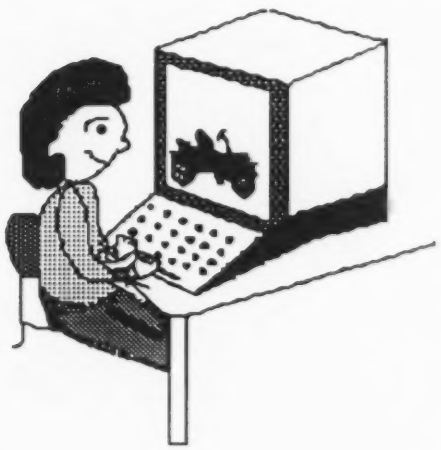
Civil engineers design and supervise the building of roads, bridges, buildings, and airports.



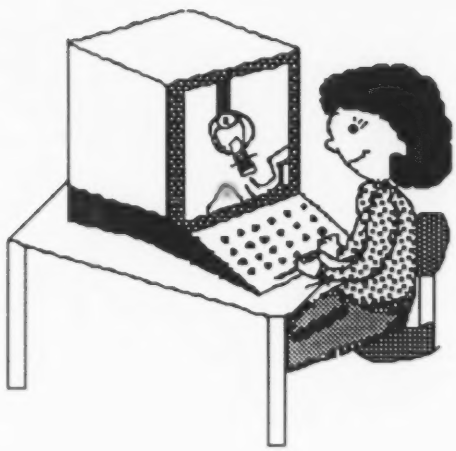
Petroleum engineers explore and drill for oil and natural gas.



Mechanical engineers design, develop, and test new machines.



Industrial engineers design and improve machines to make better products.



SCIENCE-RELATED CAREERS
Study Card

Electrical engineers work on ways to put electricity to work.

SCIENCE-RELATED CAREERS
Study Card

Technicians help the scientists and engineers.

Technicians repair machines that will not work.

Technicians make drawings for projects.

Technicians figure the cost of a new project.

Technicians make models of new projects.

Technicians work in laboratories, in hospitals, and in doctors' offices to help make us well.